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JANUARY 1993

# MacUser

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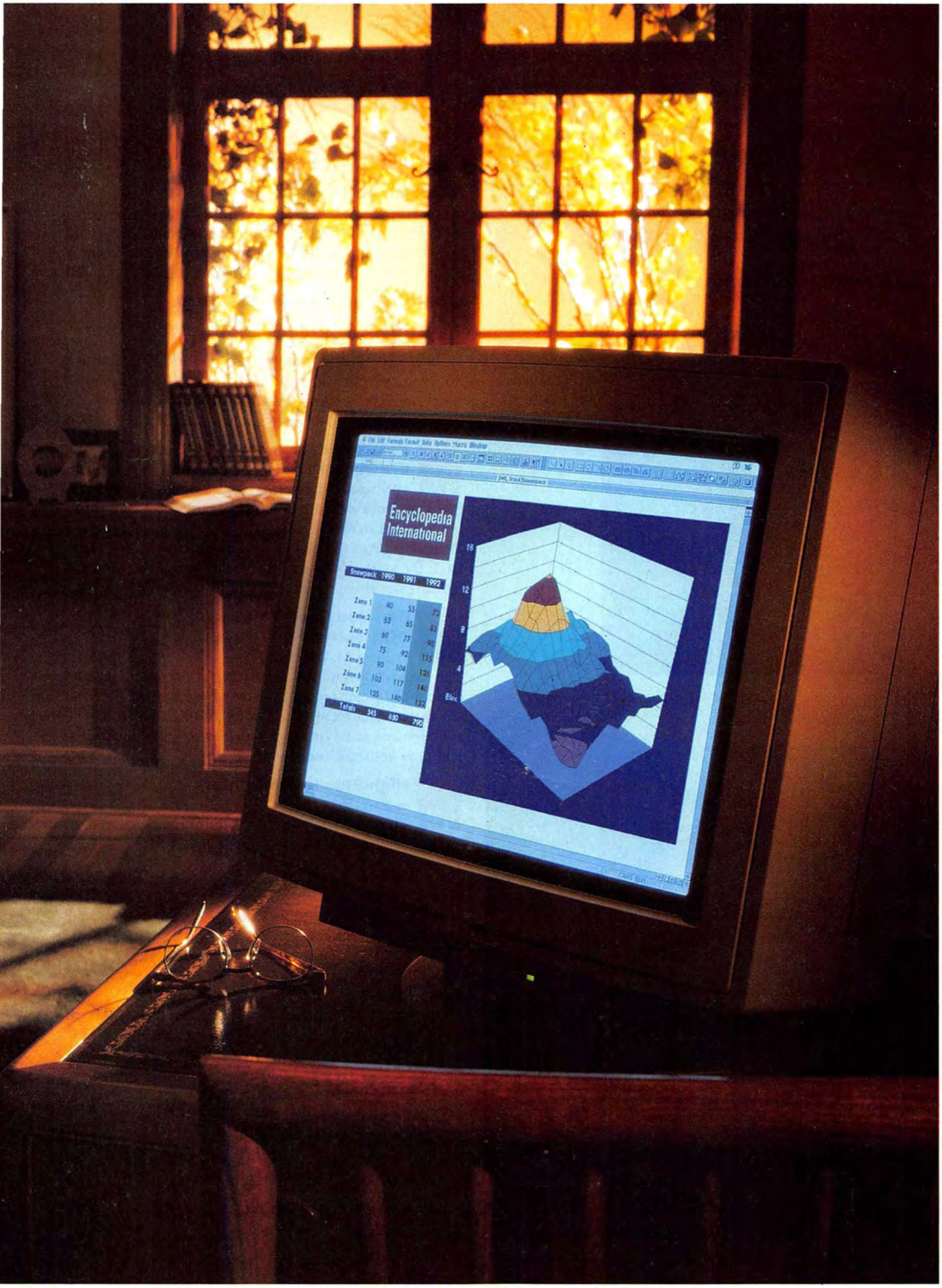
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# MacUser

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**Cover photo** by Steven Underwood




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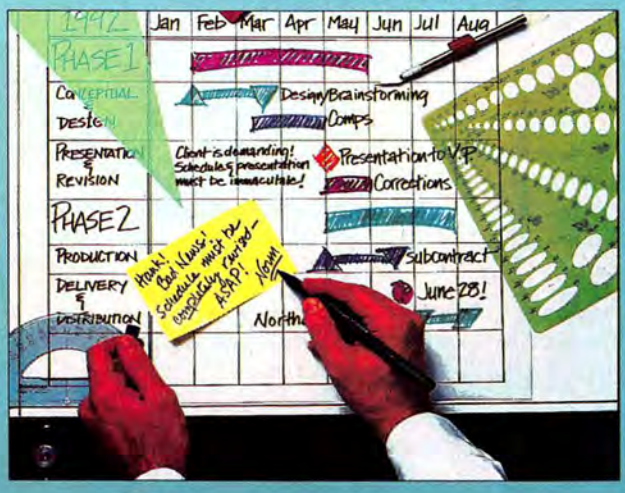
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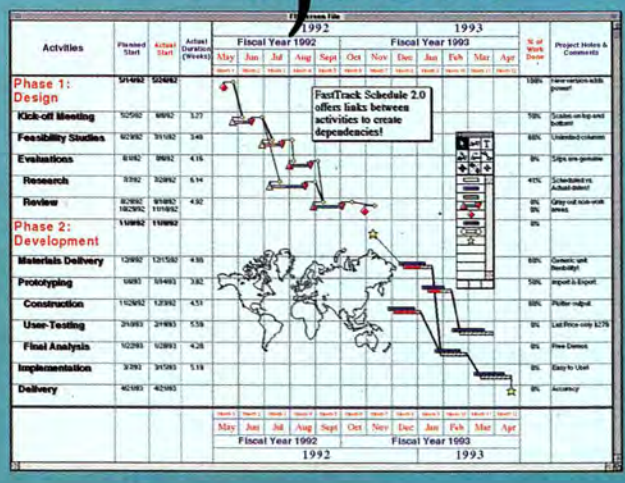

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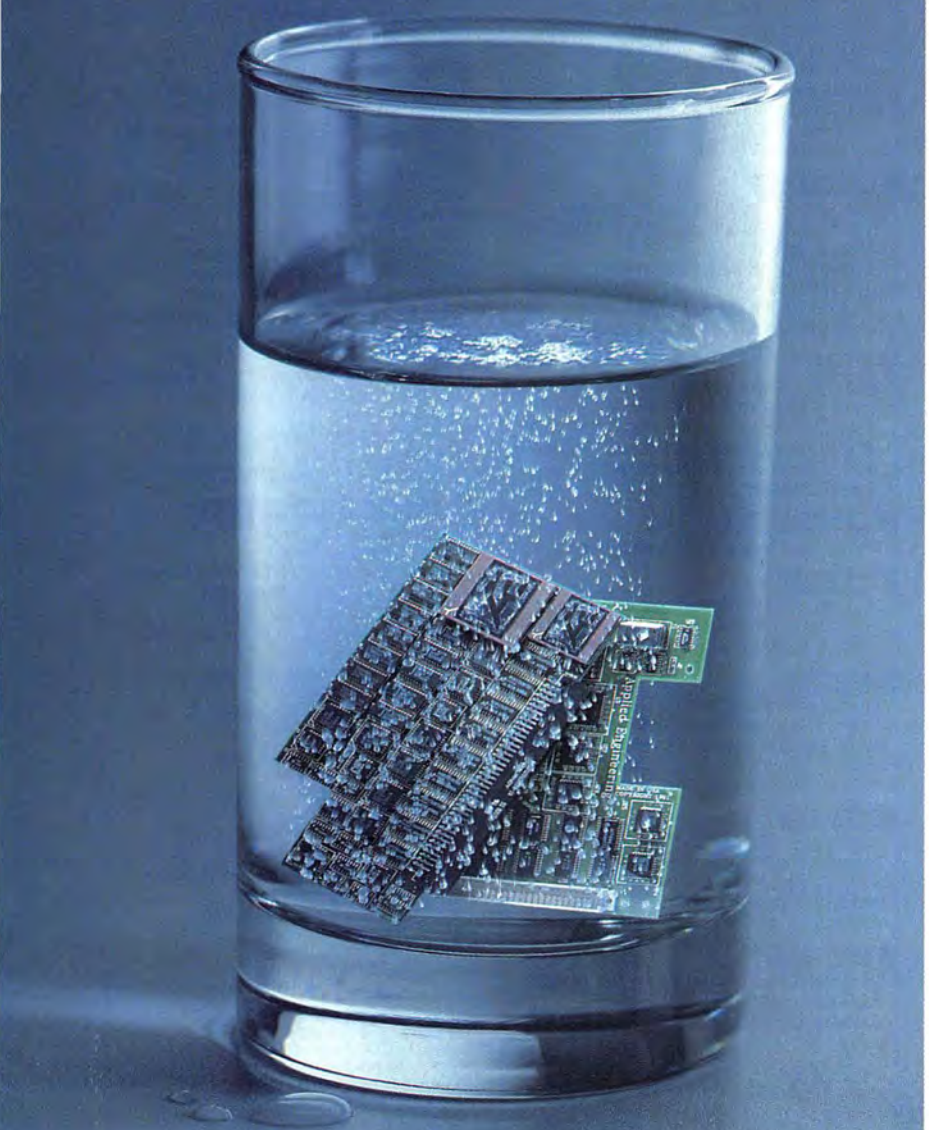
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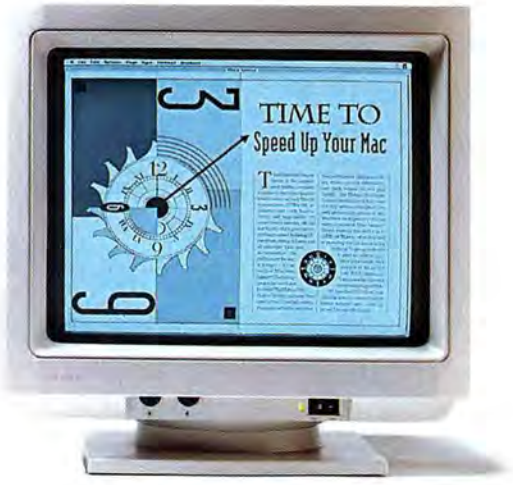
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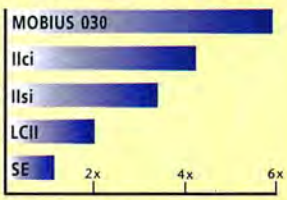



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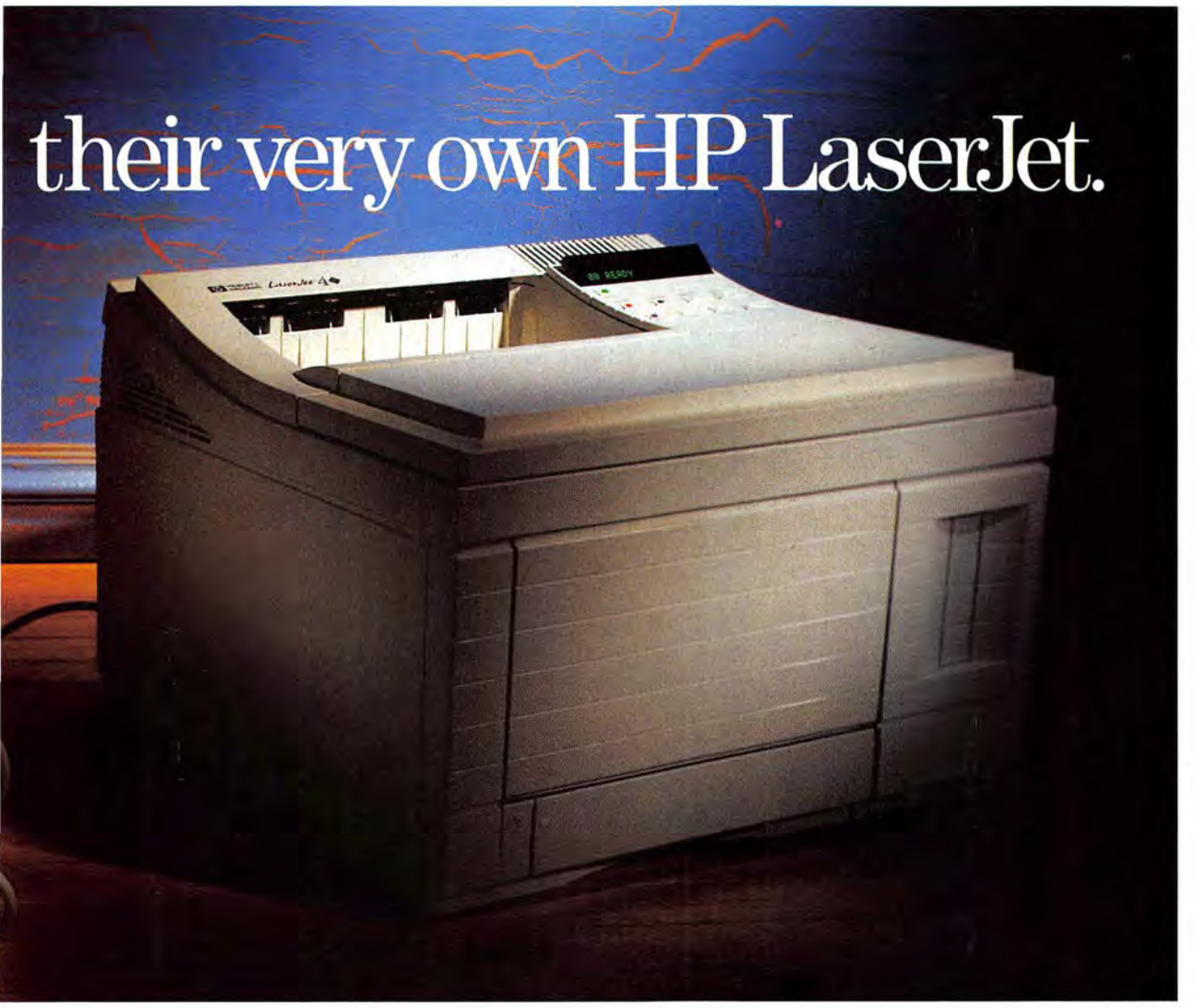



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©1992 Hewlett-Packard Company PE12276 *Suggested U.S. list price.

# their very own HP LaserJet.



HP's microfine toner, Resolution Enhancement technology, and an advanced engine expressly engineered for 600 x 600 dpi.

New generation features mean you will lose no time getting your work onto the page. A new RISC processor and 6 MB of standard memory accelerate formatting and I/O speeds, so complex PostScript language and graphics files are rendered faster and more clearly than ever before.

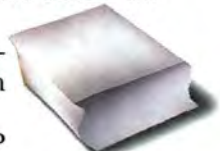


6 MB of memory built in.

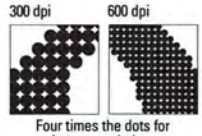
**Greater flexibility.**
But this wouldn't be an HP-caliber breakthrough if the innovations weren't across the board. That's why, even though the new generation LaserJet 4M printer is built for the Macintosh, it will perform for DOS and Windows users as well... automatically. Automatic language switching (between PCL 5 and PostScript) and three hot I/O ports (serial, parallel, and LocalTalk) make sure users are able to share the printer simultaneously. Without waiting.

Also, because of the LaserJet 4M printer's two integrated paper trays (total capacity 350 sheets) and optional 500-sheet tray and power envelope feeder, you will save time, avoid paper-handling hassles, and gain flexibility.

**HP quality and reliability.**
The new generation LaserJet 4M printer lets you enjoy the one particular no other Macintosh laser printer can offer—the renowned quality and reliability which comes with owning an HP peripheral. Not to mention our outstanding customer support,



Increased paper handling.




Four times the dots for better resolution.

where information about how to get the most from your printer is never more than a phone call away.

**Surprisingly affordable.**
Perhaps the most remarkable attribute of the new LaserJet 4M printer is the price—$2,999.*
A breakthrough in its own right.
So call **1-800-LASERJET (1-800-527-3753), Ext. 7135** to receive a print sample** and comparison disk to see the quality for yourself.† Or visit your nearest authorized HP dealer and see the printer built to add some polish to your Apple.

HEWLETT PACKARD

**To have a LaserJet 4M printer data sheet sent immediately via fax machine, call 1-800-964-1667 from your touch-tone phone. †In Canada call 1-800-387-3867, Ext. 7135. Adobe and PostScript are trademarks of Adobe Systems Incorporated which may be registered in certain jurisdictions.

# Connect Your Mac® to Any Printer with the Grappler®

The Grappler II is the world's first networkable solution for non-Apple® printers. It also works great for any stand-alone Mac or PowerBook™. The Grappler II offers substantial savings by allowing users to connect low-cost HP LaserJets, inkjets, and Epson compatible LQ dot-matrix printers to their stand-alone or networked Mac. Its unique spooling software allows background printing while you continue to work on your Mac.

| Printer | Type | Grappler Interface | Notes |
|---|---|---|---|
| **Alps** | | | |
| ALQ200, 300 Series | 24 Pin | IIsp | 6 |
| Allegro | 24 Pin | IIsp | 6 |
| ASP 1000 | 9 Pin | II 9Pin | 1 |
| P2000+, P2100, P2400 | 18 Pin | II 9Pin | 1 |
| **AT&T** | | | |
| 470, 476, 478, 479 | 9 Pin | II 9Pin | 5 |
| 570, 571 | 9 Pin | II 9Pin | 1 |
| 495 | Laser | IIsp | 8 |
| **Brother** | | | |
| 1109 | 9 Pin | II 9Pin | 2,9 |
| 1209, 1324, 1709, 1509, 1909, 1809 | 9 Pin | II 9Pin | 1 |
| 1724, 1824 | 24 Pin | IIsp | 6 |
| HL-8, HL4-V | Laser | IIsp | 9 |
| HR Series | Daisywhl | None | |
| M-2518, M-4018 | 18 Pin | II 9Pin | 1 |
| TwinWriter | 9 Pin | II 9Pin | 1 |
| **Canon** | | | |
| BubbleJet 10e, 10ex, 20, 20ex | InkJet | IIsp | |
| **CIE America** | | | |
| LiteWrite | 9 Pin | II 9Pin | 1 |
| **Centronics** | | | |
| PS210, PS220 | 9 Pin | II 9Pin | 1 |
| **C.Itoh** | | | |
| C-210, 215, 310, 315 | 9 Pin | II 9Pin | 1 |
| C-715, C-815 | 24 Pin | IIsp | 7 |
| CI-2500, CI-4000 | 9 Pin | II 9Pin | 1 |
| D10-40, F10-55 | Daisywhl | None | |
| Jet-Setter, Lips 10+ | Laser | IIsp | 8 |
| ProWrtr Jr.+ | 9 Pin | II 9Pin | 1 |
| 8510 | 9 Pin | II 9Pin | |
| **Citizen** | | | |
| 120-D, 180-D | 9 Pin | 9Pin | 4 |
| 124, 224 | 24 Pin | IIsp | 7 |
| GSX-140 | 24 Pin | IIsp | |
| GSX-200 | 9 Pin | II 9Pin | |
| MSP-10, 15E, 50 | 9 Pin | II 9Pin | 1 |
| PN48 Portable | Thermal | IIsp | |
| **Data Products** | | | |
| 9030, 9040 | 9 Pin | II 9Pin | 1 |
| 9034, 9044 | 24 Pin | IIsp | 6 |
| **DCS/Fortis** | | | |
| DM-2215, DM-1310 | 9 Pin | II 9Pin | 1 |
| **Epson** | | | |
| AP 2570, 3250 | 24 Pin | IIsp | |
| EX Series | 9 Pin | II 9Pin | 1 |
| FX-Series | 9 Pin | II 9Pin | 1 |
| DFX-5000, -8000 | 9 Pin | II 9Pin | 11 |
| ActionLaser | Laser | IIsp | 11 |
| RX-80, -100 | 9 Pin | II 9Pin | 9 |
| JX Series | 9 Pin | II 9Pin | 1 |
| GQ3500 | Laser | IIsp | 8 |
| LQ Series | 24 Pin | IIsp | |
| LX800, 810, 850 | 9 Pin | II 9Pin | 9 |
| MX80/Graftrax+ | 9 Pin | II 9Pin | 9 |
| EPL7000, 6000 | Laser | IIsp | |
| **Facit** | | | |
| C5500, 6510, 6520, 7400, 7500 | 9 Pin | II 9Pin | 1 |
| B1100, 3100, 3150 | 9 Pin | II 9Pin | 1 |
| B3450 | 24 Pin | IIsp | 6 |
| P7080A | Laser | IIsp | 8 |
| **Fujitsu** | | | |
| DL2400 | 9 Pin | II 9Pin | |
| DL4400 | 24 Pin | IIsp | 6 |
| DL2400, 3000, 5600 | 24 Pin | None | |
| DX2100, 2200, 2300, 2400 | 9 Pin | II 9Pin | 1 |
| RX7300 | Laser | IIsp | 8 |
| **Genicom** | | | |
| 1025 | 9 Pin | II 9Pin | 1 |
| 5010 | Laser | IIsp | 8 |
| **Hewlett Packard** | | | |
| DeskJet, Plus, 500/C | Inkjet | IIsp | |
| LaserJet | Laser | None | |
| LaserJet II, IIP, IID, III | Laser | IIsp | |
| PaintJet, ThinkJet | Inkjet | None | |

| Printer | Type | Grappler Interface | Notes |
|---|---|---|---|
| **IBM** | | | |
| ProPrinter | 9 Pin | II 9Pin | |
| QuietWriter | | None | |
| **Kyocera** | | | |
| F-1000A, 1010, 2010, 3010 | Laser | IIsp | 8 |
| **Kodak(Diconix)** | | | |
| 701 Portable | InkJet | IIsp | |
| 300W | 9 Pin | II 9Pin | 1 |
| **Laser Computer** | | | |
| 190E, 190A | 9 Pin | II 9Pin | 1 |
| **Lexmark (IBM)** | | | |
| 2380, 2381 | 9 Pin | II 9Pin | 1 |
| 2390, 2391 | 24 Pin | II sp | 6 |
| 4019, 4029 | laser | II sp | |
| 5183 Portable | Thermal | II sp | |
| 4070 | InkJet | II sp | |
| **Mannesman Tally** | | | |
| MT81, 85, 86, 87, 88 | 9 Pin | II 9Pin | 1 |
| MT130/9, 131/9, 230/9 | 9 Pin | II 9Pin | 1 |
| MT330 | 24 Pin | IIsp | 6 |
| MT290, MT460 | 9 Pin | II 9Pin | 1 |
| MT910 | Laser | IIsp | 8 |
| MT-SP80 | 9 Pin | II 9Pin | |
| **Nissho** | | | |
| NP2410 | 24 Pin | IIsp | 6 |
| **NEC** | | | |
| LC860 | Laser | IIsp | 8 |
| P5, P6, P7, P9 | 24 Pin | IIsp | 6 |
| P2200, 5200, 5300 | 24 Pin | IIsp | 6 |
| PC8023-A | 9 Pin | II 9Pin | |
| **Okidata** | | | |
| 80, 90 and 2410 Series | 9 Pin | None | |
| KXP-1080 Series &1090 Series | 9 Pin | II 9Pin | |
| Microline 320, 321 | 9 Pin | II 9Pin | 1 |
| ML -180 | 9 Pin | None | |
| ML-192, -192+, 193+, 292, 293 | 9 Pin | II 9Pin | |
| ML-380 | 24 Pin | IIsp | 6,10 |
| 400 & 800 | Laser | IIsp | |
| 240 | 24 Pin | IIsp | |
| ML-393+, 391+, 391+ | 24 Pin | IIsp | 6 |
| **Olivetti Office USA** | | | |
| DM 1005 | 9 Pin | II 9Pin | 1 |
| **Olympia** | | | |
| LaserStar6 | Laser | IIsp | 8 |
| NP30 | 9 Pin | None | 1 |
| NP80S, NP136S | 9 Pin | II 9Pin | 1 |
| **Panasonic** | | | |
| 1080i, 1091i, 1081, 1081i | 9 Pin | II 9Pin | 3,9 |
| 1090, 1092i | 9 Pin | II 9Pin | 4,9,1 |
| 1180, 2180 | 9 Pin | II 9Pin | |
| 1124, 1524, 2124, 2624 | 24 Pin | IIsp | 9,11 |
| 1592, 1595, 1695 | 9 Pin | II 9Pin | 1 |
| 1123, 2123 | 24 Pin | IIsp | |
| 4420, 4450, 4455 | Laser | IIsp | 8 |
| **Printek** | | | |
| 930/dlx | 9 Pin | II 9Pin | 1 |
| 2000TX, 2000CX | 9 Pin | II 9Pin | 1 |
| **Ricoh** | | | |
| PC6000 | Laser | IIsp | |
| **Seikosha** | | | |
| BP-5420 | 9 Pin | II 9Pin | 1 |
| SK 3000AI, 3005AI, SK 3500+ | 9 Pin | II 9Pin | 1 |
| MP-1300AI | 9 Pin | None | |
| SL-80AI, 130AI | 24 Pin | IIsp | 6 |
| SP 180, 185AI | 9 Pin | II 9Pin | 1 |
| SP 1200, 2000+, 1000AP | 9 Pin | II 9Pin | 1 |
| **Sharp** | | | |
| JX-9300 | Laser | IIsp | 8 |
| **Star Micronics** | | | |
| Gemini 10X | 9 Pin | II 9Pin | |
| NB-15, NB25-10, NB24-15 | 24 Pin | IIsp | 6 |
| NP-10 | 9 Pin | II 9Pin | |
| NX-10, 15, 100, 1000 | 9 Pin | II 9Pin | 1 |
| NX-1020, 1500, 2400 | 9 Pin | II 9Pin | 1 |
| SD10, SG & SR | 9 Pin | II 9Pin | |
| XB2420 | 24 Pin | IIsp | |

**Key to Notes:** Rev 10/92

1. Epson EX,FX,JX series emulation
2. Epson LX series emulation
3. Epson RX series emulation
4. Epson MX series emulation
5. IBM ProPrinter emulation
6. Epson LQ series emulation
7. Plug in cards emulate LQ-1000
8. HP LaserJet Plus emulation
9. No reverse line feed
10. Parallel extension req'd
11. Not recommended/Slow printing




**NOTICE:** Printers listed as compatible may still exhibit variations in multiple page alignment, slower print speeds and other minor limitations. Older, Motorola 68000 based Macs may exhibit slow print speed due to low performance processors. Laser printers require a minimum of 1MB of printer RAM. Mac512 works with Grappler II 9Pin ONLY, plus adapter cable. © Orange Micro, Inc., 1992

CIRCLE 35 ON READER SERVICE CARD.


About

# MacUser

## Character Flaws

Back in the '50s, so the story goes, the State Department was shown a computer program that translated between English and Russian. Sitting down at the Teletype, the secretary of state typed, "The spirit is willing, but the flesh is weak," and requested translation into Russian and back again. The computer whirred and blinked and printed out, "The wine is fine, but the meat is rotten."

That's pretty much the sort of performance we expected when we adopted the new technology of optical character recognition (OCR) to read the letters from our readers, back in 1990.

It took us a while to realize that the cleanup effort required to make the scanned-in text publishable could not begin to compete with administrative assistant Amanda Michael's fast and accurate keyboard capability. And the OCR-induced errors weren't quite funny enough either.




**Associate editor Elisa Welch applied her 20/20 insight to this month's lab report on OCR software.**

That was then. This is now. With the spate of new and upgraded OCR products on the market, it was high time to assess the state of the OCR art, and we put associate editor Elisa Welch on the job.

We found out that the rate, if not the quality, of OCR errors has improved in the past three years. According to Elisa, "You need to think of OCR as an idiot savant with a photographic memory. It can see everything clearly on a page without understanding what it means."

In other words, no spirit/wine errors — but no help from context either. Because it's visual, an OCR dictionary is different from a word processor's dictionary, explains Elisa; it interprets bit maps instead of keystrokes. In other words, it recognizes and matches shapes rather than letters. For example, whereas a spelling checker might make *MacUser macabre,* OCR is more likely to confuse *u* and *li,* turning *you* into *yoli.*

According to Elisa, about "the funniest example of OCR word mangling was when *WYSIWYG* was turned into *hoosegow.*" Although it may not seem smart to turn your typing over to an idiot savant that thinks WYSIWYG is a jail, OCR is often — with the right kinds of documents — good enough that it's easier to fix its errors than to type the text from scratch. And the latest crop of OCR packages is trainable, which means that you can make them smarter.

Elisa sees OCR as a viable time- and money-saving alternative to hiring a temp for businesses that have a whole lot of relatively clean documents.

Which means it's probably time to reinstate our use of OCR for the Letters column, relying on Amanda to steer us clear of the WYSIWYG hoosegow.

— Nancy Groth

# Multimedia Performer.




## Chinon's New CD-ROM Drive.

Multimedia is hot—and here's a CD-ROM drive that can take the heat. Chinon drives have a reputation for rugged construction and rock-solid reliability. Plus the 435 series drives are fully MPC and QuickTime compatible, with a 64KB data buffer and a sustained data transfer rate of 150KB per second. This means you can run all your multimedia applications without missing a beat.

These drives have a small footprint for easy portability, direct RCA audio outputs, and a headphone jack with full-range volume control. And our standard SCSI interface makes connection to your computer a snap.

Chinon's external drives are available for both IBM-compatible and Macintosh computers, with a half-height internal version for IBM compatibles.

Best of all, Chinon quality in a CD-ROM drive costs less than many comparable drives, not more. So call today for the reseller nearest you—and put a multimedia performer in your corner.

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CIRCLE 62 ON READER SERVICE CARD.

# LETTERS



**Daan Strebe, of Tokyo, Japan, wrote a two-page dissertation (with equations) to prove to us that Bob Levitus' Power User Test ("More Power to You," September '92, page 263) is really for nerds, not power users. Strebe defines a power user as "a person whose holistic concept of utility leads him or her unerringly toward the most efficient method of problem solving and whose solutions require an uncommonly powerful Mac configuration." On the other hand, a nerd is a person "who ruthlessly destroys his (rarely her) efficiency on the trivial pursuit of arcane ways to accomplish relatively infrequent tasks; a power waster." Perhaps, Daan, but what do you call someone who takes power-user tests and then writes two-page dissertations (with equations) about them to the editor?**



**Write to Letters to the Editor, c/o *MacUser,* 950 Tower Lane, 18th Floor, Foster City, CA 94404, or post your letter on the MacUser Forum of ZiffNet/Mac, our on-line service.**



**All letters become the property of *MacUser,* and we reserve the right to edit any letters we print. Please include a return address and a daytime phone number.**

### Bortman's Mobile Home

Thank you for the new Mobile Mac column ("Synchronicity," October '92, page 261). I have recently acquired a PowerBook and am trying to switch from my paper Day-Timer to an electronic one. (Synchronizing files has been quite a challenge.) The article was very helpful, and I hope to see more. I'd like to add an additional program to the list of PowerBook applications discussed by Henry Bortman.

Zync, by Ricardo Batista, allows users to set up a Remote folder and a Local folder. The remote computer can be mounted automatically, and the two folders are compared for the most-recent versions. Zync has the same downfalls as the programs mentioned in Bortman's article; however, it is freeware and available on America Online. What more could one ask?

Eric Hards
Campbell, CA

I looked forward with great anticipation to your new column Mobile Mac, by Henry Bortman. But, golly, poor Henry! So far, both columns have been so filled with whining and complaining and wishful self-indulgence that I haven't learned a thing about PowerBooks from him. The idea for a help column on PowerBooks is a great one, but — really — couldn't you have it written by someone who *enjoys* using a PowerBook?

Kate Bornstein
San Francisco, CA

### What's in a Word?

Although I agree with most of your assessments of MacWrite and Word 5.0 ("The Right Word Processor," September '92, page 100), you completely ignored one aspect of these word-processing programs: their multilingual capabilities.

I occasionally draft letters in French. I have a French version of MacWrite II, with a reasonable French dictionary that works well. (It certainly works better than that of the previous MacWrite, in which the English

## Dear Mr. Sculley . . .

There's a lot of dusty software out there, if the continuing stream of letters answering September's shelfware question is anything to go by. Maybe someone should start a software mausoleum — er, museum — for programs such as (remember these?) Ashton-Tate's dBASE Mac and FullWrite Professional, Lotus' Jazz, Target's Scoop, and more.

Integrated packages, which try to be all things to all people, languish in several closets. Louis Skulnick, of Buffalo Grove, Illinois, bought Jazz over Microsoft Works but soon abandoned it when he discovered that he couldn't copy it. "I strongly believe that because of its copy-protection obsession, Lotus destroyed any chance Jazz had at industry acceptance and then left it to die — rather than adapt." Not surprisingly, his other shelfware is copy-protection-buster Copy II Mac.

Lest you think only software gets shelved, several readers have tossed hardware into their closets. Mike Taylor, of San Antonio, Texas, writes fondly of his now-obsolete DASCH 2048, purchased for his Mac 512Ke. "It was a lightning-fast disk drive that even today flies beyond the fastest of hard drives." From Jackson, Wyoming, David Swift offers: "A Rodime 20. A Seagate 20. A Miniscribe 40. All dead as doornails well before the MTBF, after warranty. Moral: Buy Quantum."

And what about utilities, INITS, cdevs, and so on? "My QuicKeys2 is gathering dust, because the manufacturer, CE Software, had assured me before I bought it that it could make the letter 'o' with a macron over it, like this 'ō,' writes Walter H. Drew, of Florence, Oregon. "But QuicKeys2 can't make an 'ō,' a character that is necessary in order to print standard Japanese text in romanized letters. QuicKeys2 does *macros,* not macrons. If you want to type an 'ō,' get Ares Software's FontMonger."

Randy Lewis, of Palo Alto, California, steers clear of ResEdit. "I don't understand how to use it, and it seems to have the very powerful potential to make a real mess out of my system." He switched to Norton Utilities but adds, "It crashed so many times in the first week that I had to wear a crash helmet when I sat at the keyboard."

J. Reviere, of Conroe, Texas, sent in a laundry list of his dirty dozen, which included FullWrite Pro and Microsoft Works. He's probably the only one who views After Dark as passé, because he saw "an interview with Houston's superintendent of schools the other day . . . there behind him: a Mac IIsi with 'Warp' running."

This month, with the Apple/IBM alliance in full swing, companies that would be considered strange bedfellows are joining forces. Word on the street is that Microsoft and Nintendo are getting together. What's next? Super MarioWorks?

### Speak Up:

**What companies should Apple form alliances with, and why?**

*Send your thoughts to Dear Mr. Sculley, c/o* MacUser, *950 Tower Lane, 18th Floor, Foster City, CA 94404.*

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THE SCREEN SAVER

Captains Log: Stardate 1992



On our mission to prevent phosphor burn-in...



...we found ourselves surrounded by Klingons!



I asked Mr. Spock and Dr. McCoy for a full diagnosis.

Bones said the problem was burn-in, and a new screen saver was the answer.





So we beamed some tribbles into the Klingon engine room and headed for Earth to pick up a copy!

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and the French versions were often confused when you launched the application from a file.)

Another criterion for evaluating word processors could be the ability to develop shortcuts for foreign-language accents and — more important — universal commands for the different languages.

Paul Vilandré
Menlo Park, CA

I have been reading *MacUser* since its inception, and your September '92 issue was one of the best thus far. As a Mac Plus owner, I appreciated "New Life for Old Macs" (page 132); I have been waiting for and needing such an article for many months. Don Crabb's suggestions were appropriate for the "average," limited-income Mac user, and the candid pro-and-con upgrade suggestions were helpful and right on target. "The MacUser Shareware Awards" (page 152) was also excellent for Mac owners (like me) who prefer to pay $10 to $20 for software that usually suits my needs better than $100 software that has many unnecessary features.

The article on Mac word processors (page 100) was informative, but like other reviews of Mac word-processing applications, it neglects the purpose of the programs in favor of rating them according to the number of functions and how accessible those functions are to users. As a student, I use my word-processing program on my PowerBook constantly. My professors don't care if I use Word 5.0, and they can't stand boldface or shadow-style fonts. Essays don't require style sheets, table-of-contents capabilities, or extensive graphics features. They just need to look presentable and offer a clear, well-written argument.

The word processor judged the best should be the one that (depending on your needs) lets your work be the best. For most of my writing, I need a blank page, simple formatting, a thesaurus, spell checking, and reliability. Features such as built-in graphics capability, mail merge, and page layout are great to have on call, but I urge software publishers to make the features unobtrusive and *let writers write* with word processors. Why don't we have a Hide Features command in word processors that gives users a blank page without menus or rulers?

In the future, I urge you to consider how easy it is to do one's work with an application. Sometimes the best solution (even in computing) is the simplest.

Pete Chane
Madison, WI

### Who's Spoolin' Who?

You were too quick to award four mice for the SuperLaserSpool application (Quick Clicks, October '92, page 83). It's advertised as being compatible with the Apple ImageWriter II, but it isn't. The printer slows to printing for five seconds and resting for eight seconds. With ATM, printing is almost nonexistent.

One of Fifth Generation's technical-support crew admitted that SLS has a conflict with the ImageWriter II printer, which the company hasn't been able to correct; yet in its manual, it claims that there is no problem.

David Walters
Monterey Park, CA

*Fifth Generation maintains its claim of compatibility, but if we had managed to dig up an ImageWriter II and found the conflict you describe, we would have reported it. In any case, we have to wonder: Is an ImageWriter II really the right printer for someone who cares about speed as much as you do? — KO*

### Facts on Macs and VAX

I enjoyed the article "Double Features: Working with Macs and PCs" in the October '92 issue (Buyer's Guide page 10). I was working in an environment that included character-based terminals on VAX hardware and PCs, and there were tremendous productivity advantages once we'd purchased WordPerfect 5.1 for VMS. The ability to pass files between platforms and not lose layout information seemed almost magical when we first started doing it.

One possibility that was not discussed in the section on file-translation software is to use networking software and hardware rather than an application translation to floppy disk. Digital's PathWorks automatically translates file formats while networking files across different platforms. PathWorks is a series of products that includes a server (or servers) running VMS, Ultrix (DEC's UNIX), OS/2, MS-DOS, UNIX, or the Macintosh operating system. The server appears as one or more disk drives on the clients, and files can be written or read to them with software that does whatever translation is necessary to convert the file. This network software includes additional

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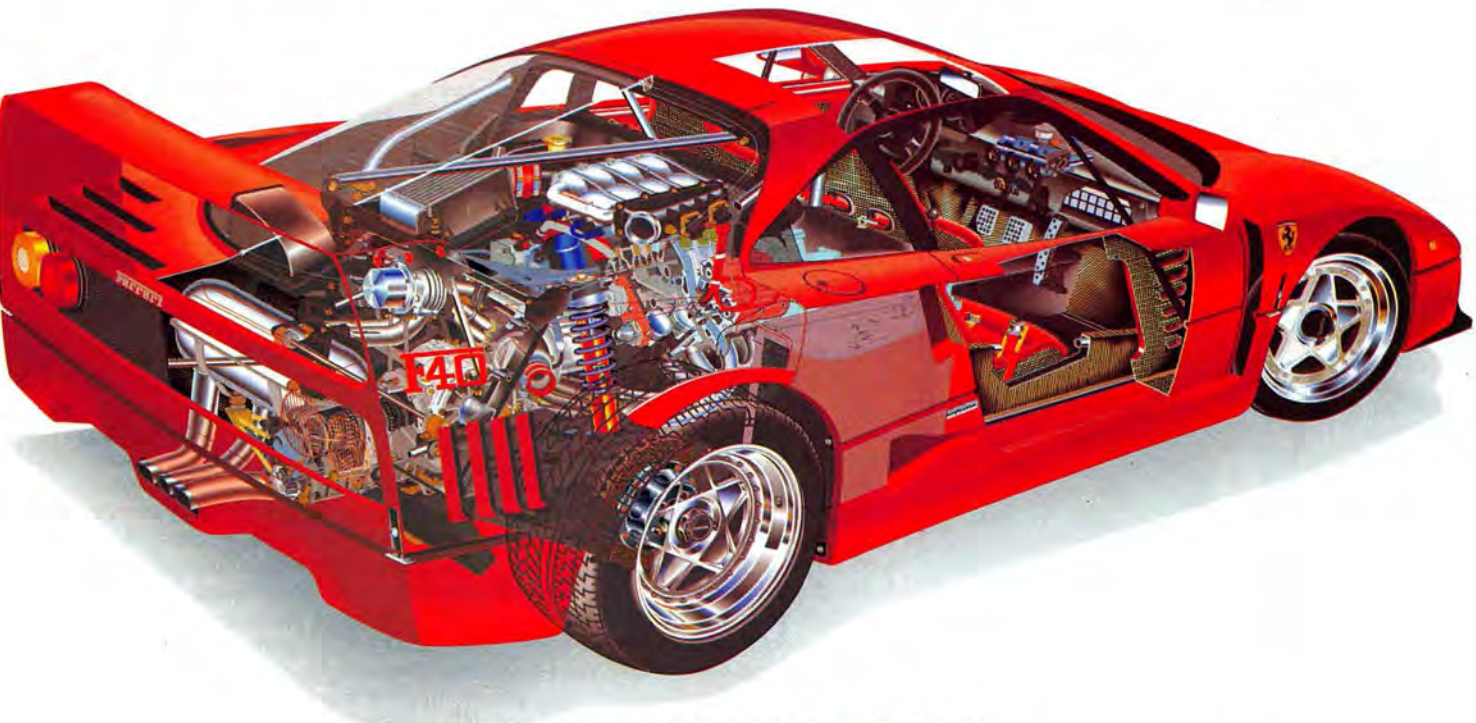
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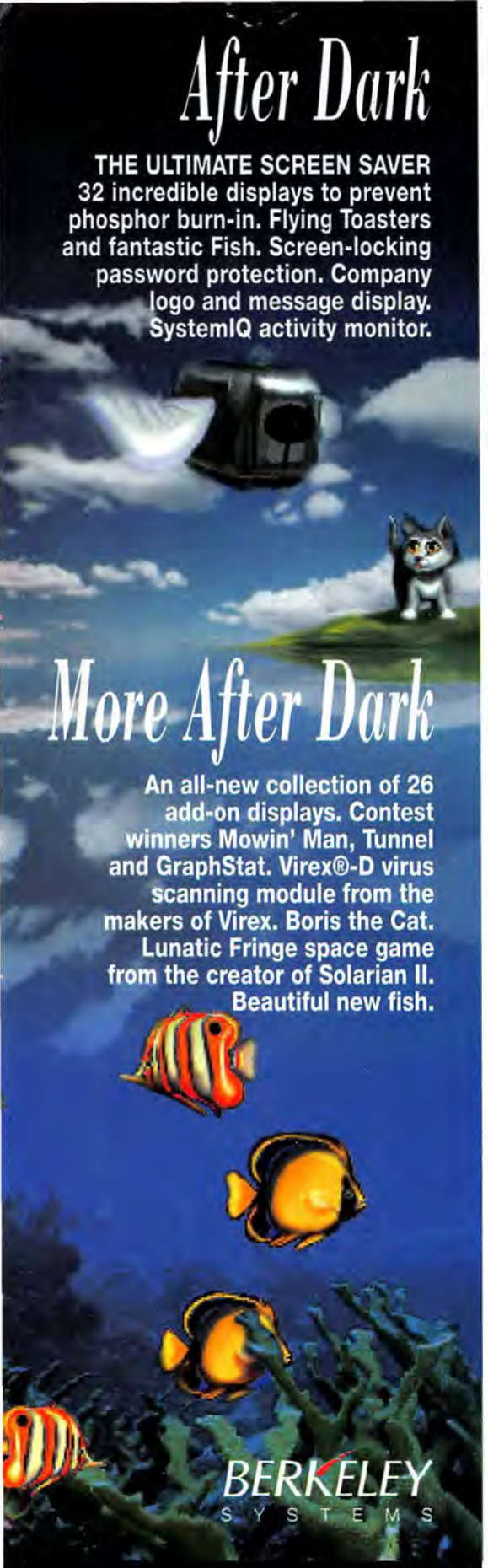
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# LETTERS

features such as print-resource sharing and file security.

I imagine that other vendors are offering similar products, but I wanted to emphasize the tremendous productivity increase a network solution offers, for about the cost of installing another hard drive.

Lyle Schofield
Columbia, MD

### The Vanishing Point

In the bio of David Biedny that accompanies "The Third Dimension" (September '92, page 114), Biedny states that life is "a 3-D movie that doesn't need special glasses." After reading his evaluation of the ElectricImage Animation System, I suspect he *does* need glasses.

How can a rendering program that does not provide ray tracing or even shadows receive the highest rating in the Rendering Quality category? Even more laughable was his nomination of this ridiculously overpriced program — which can't create models, and has (in Biedny's words) "very weak documentation" and "relatively weak animation" — as a price/performance winner!

For ElectricImage's price of $7,500 (which doesn't include the price of a decent front-end modeler), a user could purchase Strata's StrataVision 3d, a couple of Radius Rockets, and Strata's RenderPro to get a very competitive rendering engine with superior graphics.

Image quality is understandably subjective. By adding benchmarks and sample images of identical scenes rendered by the products being tested, *MacUser* could give its readers the information they need to form their own conclusions.

Michael Steiner
Indianapolis, IN

*One of the main purposes of the article was to focus on the differences in the requirements of different groups of Mac 3-D users. Although StrataVision is a fine example of an inexpensive integrated modeler and renderer and a fine choice for certain people, it simply doesn't offer many of the advanced production and broadcast-oriented features found in ElectricImage. The two products are clearly meant for different audiences. Based on my own experiences and countless discussions I had with high-end 3-D users while researching and writing the article, ElectricImage consistently turned up as the most popular high-end production-oriented rendering and animation product. As for benchmarks, see "Network Renderers: Drawing on All Resources" in this issue. — DB*

### That Apple Must Have Hurt

After reading John C. Dvorak's "I Sack Newton!" (September '92, page 394), I just had to write in disagreement. First of all, Dvorak states, "Technology doesn't advance in sudden leaps and bounds." He's right, of course. He is mistaken, however, when he implies that the Newton is a "leap" in technology. This small, pen-based system combines a touch-sensitive screen, a stylus, and OCR software, things that have been around for quite a while and have proved themselves in everyday use.

The only thing a $16 store-bought computer can do is add, subtract, multiply, and divide and perform a few other mathematical functions. A Newton for $995 is inexpensive, because of what you get for the price! I'm sorry, but although a clipboard and a pencil cost about $990 less, they don't do as much as a Newton.

Dvorak should spend less time griping about secondary matters and focus on real problems. He spends 14 words talking about real problems such as batteries and screen size but never once offers uses for the Newton.

Joshua Senecal
Spring Valley, CA

I agree with Dvorak that at around $1,000, Newtons are not inexpensive and therefore must be handled with care, but it's kind of pathetic to say that pen computing is not going to succeed unless the machines are as unbreakable as a piece of paper. The Newton is much like any high-tech consumer-electronics product — and you don't see people freaking out about dropping a camcorder.

After he bashes screen size, battery duration, and handwriting recognition, Dvorak says that there are better solutions that cost less — pads of paper. But imagine a computer behind the paper that would straighten out drawings, format letters, insert spaces, and provide various electronic forms with automatic checks to validate user input, and you can imagine the possibilities.

I disagree that "throwing silicon technology at [old technologies or anything that already works well] is an incredible waste of technological resources." On the contrary, it's a great opportunity to use silicon technology to improve a piece







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## LETTERS

of paper. Unlike current computer technology, an electronic notepad should work seamlessly and transparently, allowing the user to focus on the problem at hand and not on the tool being used.

Finally, why is "a computerized notepad just plain stupid"? I usually sketch diagrams and ideas first on a paper notepad before typing or redrawing it on a computer, because ideas don't always come to mind when I am sitting in front of a computer screen. An electronic notepad would allow me to quickly record the ideas and would also provide me with tools for manipulating and organizing this information.

Carlos Bazzarella
San Mateo, CA

### Mouse-to-Mouth Recitation

**T**he prospect of pocket-sized portability and huge memory is marvelous, but to me the abandonment of the mouse and the keyboard, already happening with the Newton, is a step backward. I don't want to handwrite information to my Mac; my writing is terrible and much slower than my typing.

I also don't want to give voice commands. I often use my Mac late at night, and I don't want to disturb the rest of the household by talking to my Mac. I can imagine the cacophony that would result in an office setting with whole rooms full of people talking to their Macs. One advantage of computers in general is that they are quiet compared with typewriters and old-fashioned adding machines. What's to keep one Mac from reacting to a command meant for the one at the next desk, if that operator has a louder voice?

I can see the advantage of the pressure-sensitive pen for graphics, but please don't make me go back to handwriting my letters and lists.

Mary M. Ausman
Scottsdale, AZ

### River Deep, Margin High

**E**arth to Dvorak?! Your comments on what Apple should do ("Hail to the Chief," October '92, page 378) show how far out of touch you are with the Mac, the computer industry, and general business.

If an engineer told me he wanted to put a Mac II into a traffic sign, I would promptly show him the door. Even at $300, the Mac as a dedicated controller would be a waste. The Mac's best use is as a general-purpose computer. It can run database, page-layout, spreadsheet, and word-processing programs; mainframe links; terminal emulators; multimedia; and whatever else — all at the same time (no expanded or extended memory, and no need to edit your WININI.SYS file for this or that software). An IBM PC is a wiser choice for a traffic sign, because it is better (cheaper!) at any *one* of these tasks. Let the Mac control all the traffic signs from the city planner's desk!

I wonder why you haven't been asked to run Apple. You seem to be full of these great ideas. A low priced, high-margin Mac . . . hmm . . . sounds like an LC to me. Although the margins may not be high, it can do what any other Mac can do. The problem is that you shop like an IBMer, looking only at price. You should be shopping to fit your needs! If you look at what you want to do with a computer, an LC can outperform most IBM PC 386s — and it costs less! You should evaluate systems as a whole, not just in terms of the cost of the hardware.

Dan Guenst
Technical Training Center
U.S. Postal Service
Oklahoma City, OK

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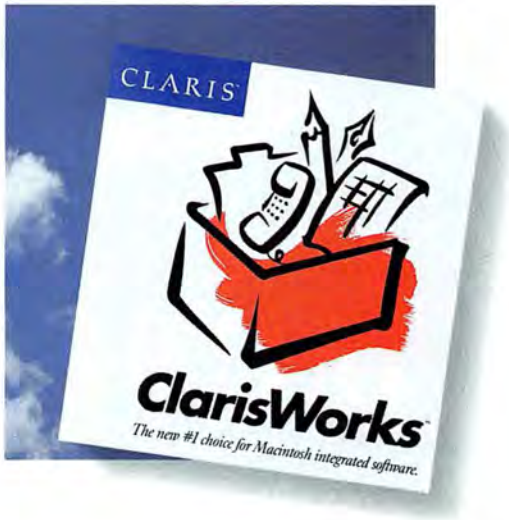
### Clarifications

In the October issue on page 48, the toll-free number for QMS is incorrect. The correct number is 800-631-2692.

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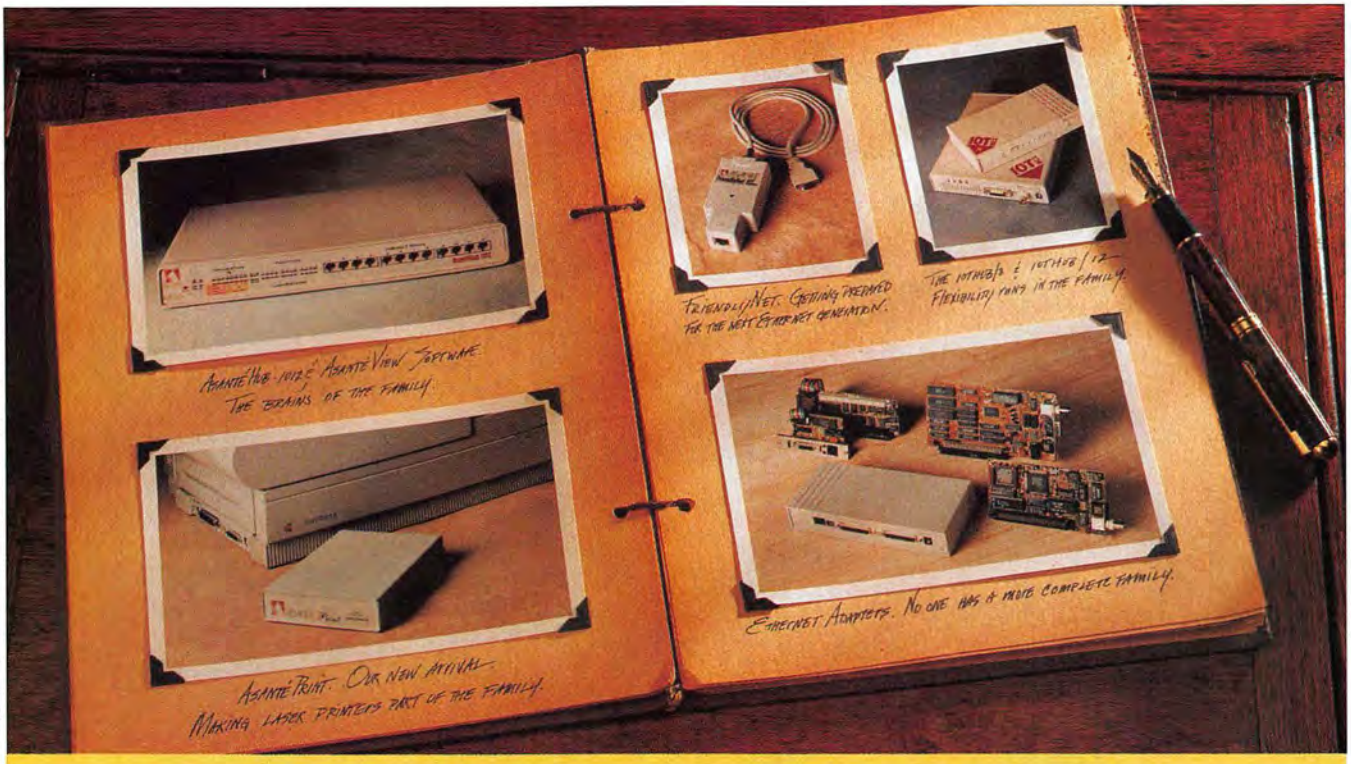

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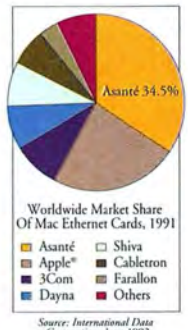
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JON ZILBER

# Geniuses at Work



**As the Macintosh turns nine this month, here's a celebration of some of the latest flashes of brilliance that keep it fresh and ingenious.**

Maybe it's one of those left-brain/right-brain things, but Mac users seem to have a special affinity for certain things that display a characteristic elegance, an extraordinary simplicity, or a flair for ingenuity. Life's little gems of genius — such as Calvin and Hobbes, National Public Radio, Ben & Jerry's Cherry Garcia, or "Star Trek" (especially "The Next Generation") — seem to strike an unusually loud chord among Mac users.

The Macintosh environment is full of little details that separate the truly user-friendly machines from the Windows-come-latelies. Although the differences may have grown less obvious, the gulf separating the Mac from the competition certainly hasn't lessened any. Here's a sampling of some of the details that continue to make the Mac a unique pleasure to work with.

The PowerBook Duos are a good place to start. The Duo system is chock full of design details that could come only from a company that controls both the computer hardware and the overall operating environment. For example, the Duos know to automatically go to sleep to conserve battery life when you shut the lid. The whole docking strategy is intelligently designed to prevent you from making mistakes. Unlike PC-compatible dockers, the Duo Docks don't let you yank the notebook out of the docking station in the middle of a file transfer.

And there's a less obvious and undocumented cleverness built in to the whole concept of a docking station. Many companies have a one-employee/one-CPU policy. Although you may not be able to get approval for both a desktop machine and a notebook computer, a docking system offers you a loophole: Get one CPU (a dockable notebook) and a collection of peripherals (a docking station, an external color monitor, and a full-sized keyboard) for your desktop.

### Designer Genius

Check out the latest new software, and you'll always find a bumper crop of new tools that show a flair for genius. Aldus' IntelliDraw is the home of two of my current favorites: the Symmetrigon and the Connectigon. The Symmetrigon makes drawing an infinite variety of symmetric shapes simple, and the Connectigon eliminates the hassles of making certain that corners and edges are precisely aligned.

The latest version of Microsoft's PowerPoint features a tool that earns kudos both for what it does and for its nickname. The "California" drawing tool (officially called the Freeform tool) lets you create shapes that include freehand curves as well as straight lines. (If you're familiar with the geographic outline of the Golden State, you'll see how the tool gets its nickname.)

The software included with the Kensington Microware Turbo Mouse is an unexpected bonus that transforms a fine trackball into a real productivity booster. The Brilliant Cursor feature, for example, lets you assign regions on your screen that allow the trackball to instantly and precisely teleport the cursor across your monitor at warp speed.

When competition and innovation combine to fuel the flames of innovation, a continual stream of solutions that leapfrog one another is the result. When Apple left some key features out of the PowerBooks (such as battery management and keyboard-level security), Connectix was quick on the scene with the release of CPU (Connectix PowerBook Utilities). And now, a scant couple of months later, After Hours' just-released suite of PowerBook utilities — called GUM (Guy's Utilities for Macintosh) — ups the ante, adding a variety of user-customizable options that let you tailor your PowerBook to automatically adjust its operation, on the fly, to your particular circumstances. (But the most impressive thing about GUM has nothing to do with PowerBooks: GUM lets you banish that pesky Balloon Help from your menu bar just by checking a box.) You can be sure that new players and new versions will keep the one-upmanship going in this arena for quite a while.

Sometimes what goes on behind the scenes is almost as good as what shows up in the products. From this month's mailbag comes a press release from game maker Spectrum HoloByte, which has named William Figueroa as its national spokesperson for its Wordtris game. If the name William Figueroa sounds vaguely familiar, it should: Figueroa is the 12-year-old boy who made the correct spelling of spuds one of 1992's most notorious political hot potatoes (and, yes, Dan, it does get an *e* for the plural).

Sometimes it's a turn of phrase that reveals the vision behind a product or a marketing strategy. Fred Ebrahimi, CEO/president of Quark, once told me he attributes

Quark's success to what he calls the Jimi Hendrix strategy: Build a loyal following in smaller, European markets, and success in the U.S. will inevitably follow. (Fred also has a knack for well-turned mixed metaphors — or should that be nixed metaphors? — that rivals the legendary talents of Samuel Goldwyn and Yogi Berra. Describing the plight of hapless software users, he once explained how some software vendors insult their customers by "adding salt to injury.")


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### It's All in the Genius

You know those "genius grants" you hear about every year or so? They come with no strings attached and are designed solely to allow brilliant people to focus on new ideas, without regard for how or when they might pay off. If anyone in the Mac business deserves one of those grants, it's the folks at The Voyager Company. Voyager is responsible for a string of educational and entertaining CD-ROMs and videodiscs that never fail to delight. Its Expanded Books series of current best-sellers and classic works of literature on-disc has begun to transform the way we interact with the written word.

Why carry around a PowerBook instead of a paperback? If you like to have several books in progress (or for

**You know those 'genius grants' you hear about? If anyone in the Mac business deserves one, it's the folks at The Voyager Company.**

reference) handy, you can easily keep an entire library on your PowerBook. (Even a single fat hardback can be burdensome; at two and a quarter pounds, *Genius,* James Gleick's highly recommended biography of physicist/gadfly Richard Feynman, weighs in at more than half the heft of a PowerBook Duo 230.)

Electronic reading also lets you instantly check back all references to a particular character or theme. That's especially welcome when you resume where you left off midway in a novel and need to remind yourself of who did what to whom with the candlestick in the conservatory, 150 pages and two weeks ago.

Finally, I'd like to direct your attention to a colorful brilliance in our own midst. The look and feel of many of the technical and special-interest sections of *MacUser* are largely due to the whimsical, elegant, and insightful graphics from the electronic pen of technical illustrator Mark Sweeney. While Mark is on medical leave for an issue or two, you'll be seeing the work of several guest artists. And much as we're sure you'll enjoy their work, we wish Mark a speedy recovery and look forward to the return of his strokes of genius.

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- ☐ Adobe Photoshop Video #1
- ☐ Adobe Photoshop Video #2
- ☐ Adobe Photoshop Video #3
- ☐ Aldus Freehand Video #1
- ☐ Aldus Freehand Video #2
- ☐ Aldus Freehand Video #3
- ☐ Aldus PageMaker Video #1
- ☐ Aldus PageMaker Video #2
- ☐ Aldus PageMaker Video #3
- ☐ Aldus PageMaker Video #4
- ☐ Aldus Persuasion Video #1
- ☐ Aldus Persuasion Video #2
- ☐ Aldus SuperPaint Video #1
- ☐ Aldus SuperPaint Video #2
- ☐ Aldus SuperPaint Video #3
- ☐ Claris FileMaker Pro Video #1
- ☐ Claris FileMaker Pro Video #2
- ☐ Claris FileMaker Pro Video #3
- ☐ Claris MacDraw Pro Video #1
- ☐ Claris MacDraw Pro Video #2
- ☐ Claris MacProject II Video #1
- ☐ Claris MacProject II Video #2
- ☐ Claris MacProject II Video #3
- ☐ Claris MacWrite II Video #1
- ☐ Claris MacWrite II Video #2
- ☐ ClarisWorks Video #1
- ☐ ClarisWorks Video #2
- ☐ ClarisWorks Video #3
- ☐ ClarisWorks Video #4
- ☐ Deneba Canvas Video #1
- ☐ Deneba Canvas Video #2
- ☐ Deneba Canvas Video #3
- ☐ Claris HyperCard Video #1
- ☐ Claris HyperCard Video #2
- ☐ Claris HyperCard Video #3
- ☐ Intuit Quicken Video #1
- ☐ Intuit Quicken Video #2
- ☐ Lotus 1-2-3 Video #1
- ☐ Lotus 1-2-3 Video #2
- ☐ Lotus 1-2-3 Video #3
- ☐ Macintosh (6.0 or 7.0) Video #1
- ☐ Macintosh (6.0 or 7.0) Video #2
- ☐ Macintosh (6.0 or 7.0) Video #3
- ☐ Microsoft Excel Video #1
- ☐ Microsoft Excel Video #2
- ☐ Microsoft Excel Video #3
- ☐ Microsoft Excel Video #4
- ☐ Microsoft Excel Video #5
- ☐ Microsoft Word Video #1
- ☐ Microsoft Word Video #2
- ☐ Microsoft Word Video #3
- ☐ Microsoft Word Video #4
- ☐ Microsoft Works Video #1
- ☐ Microsoft Works Video #2
- ☐ Microsoft Works Video #3
- ☐ Microsoft Works Video #4
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CIRCLE 83 ON READER SERVICE CARD.

# Even in today's econo amazing growth

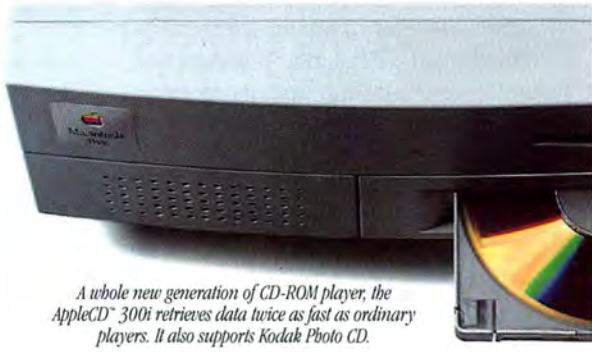


*The new Macintosh IIvx (shown here with our new 14" Macintosh Color Display) is the most flexible Macintosh II available. It's also fast, powerful and extremely affordable.*



*To take full advantage of its stereo-out sound capabilities, plug in your own pair of self-powered speakers — and get the most out of this great multimedia Macintosh.*





*A whole new generation of CD-ROM player, the AppleCD™ 300i retrieves data twice as fast as ordinary players. It also supports Kodak Photo CD.*



*While 4 megabytes of memory are standard, you can add up to 68 megabytes of RAM to help you zip through even the most complicated projects.*

In these times when every budget dollar is precious, the new Apple® Macintosh® IIvx personal computer is ideal.

It's fast. It's powerful. And it costs a lot less than you'd think. But equally important, it's prepared for the next economic expansion, when you'll want to add onto its already vast capabilities.

Inside its sleek exterior resides a 5¼" expansion bay — room for an internal CD-ROM drive, SyQuest drive or other mass storage devices — as well as a standard 3½" bay for either an

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# my, one can still find opportunities.



*Pop in E-Machines' video/Ethernet card, and get high-performance video and high-performance networking all in one. This is just one of the many expansion cards you can buy separately.*



*Another option in the 5¼" bay — a 44- or an 88-megabyte SyQuest drive that uses removable cartridges for archiving or transferring large projects.*



*Out of the box, the Macintosh IIvx supports up to a 14" monitor and 256 colors. Add a card and some VRAM, and it can handle up to a 21" monitor and millions of colors.*



*With its 32-bit architecture and 32 MHz 68030 chip, the Macintosh IIvx gives you seven times the performance of a Macintosh Classic® computer.*

*The Macintosh IIvx comes with a microphone and sound jack for adding sound to HyperCard® stacks and QuickTime™ movies or voice-annotating documents.*





*Plug in a third-party card like the VideoSpigot, and you can transfer video directly from a camcorder or VCR to your hard disk – for making your own QuickTime movies.*




*For massive backup, you can buy a DAT unit for its 5¼" bay, and have gigabytes of storage.*



*When you buy the Macintosh IIvx with CD-ROM, we'll give you nine CDs to get started. So you can immediately begin accessing applications, photos, games — even entire books.*





*If all of the internal expansion capacity isn't enough, it has support for up to five external peripherals, built-in networking, printer and modem support — just like every Mac.®*



80-megabyte or a 230-megabyte internal hard disk drive.

It also gives you three NuBus™ slots and an accelerator slot so you can add even more power and performance.

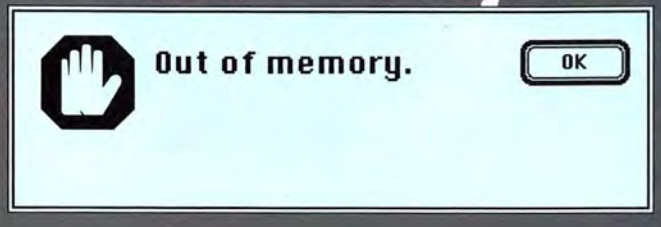
To see the new Macintosh IIvx for yourself, visit an authorized Apple reseller today. For the power you need most of all. The power of Macintosh. The power to be your best.®

## Introducing the Macintosh IIvx.

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# Coming soon to a screen near you.




If you think the only way to avoid running out of memory is to avoid running a couple of your favorite applications, think again.

Think about all those memory-hogging fonts and sounds you've got stuffed into that bulging System File.

Then do what over 200,000 resourceful Mac users do every day.

Instead of closing your applications, open a Suitcase.™

Suitcase is the award-winning utility that lets you park your growing collection of fonts, DAs, FKEYs and sounds *outside* the System File.

Thereby giving you the maximum amount of memory for running more applications, building bigger documents and doing other useful things.

What's more, Suitcase compresses your screen font and sound files by up to 60%.

Thereby giving you that much more precious disk space to work with.

It even lets you put your screen and printer fonts on a server for all to share.

Thereby making each disk on the network that much more spacious.

The more resources you have—and the more organized you are—the more memory and disk space you'll save.

But whether your dividends are measured in megs or merely in Ks, Suitcase is guaranteed to save you gigabytes of aggravation.



Even if you're operating in System 7.

Because System 7 still stuffs your resources into your System File.

And System 7 still makes you close down all your applications and restart your Mac each time you install a new font.

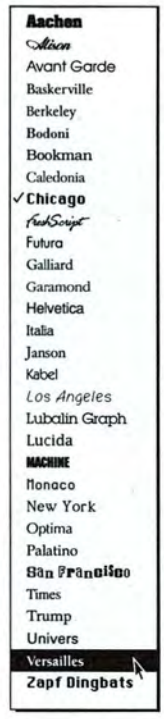
Which is a real pain in the, uh, system.

Suitcase, on the other hand, gives you unlimited access to all your resources.

And total control over how you organize them.

Each suitcase can pack up to 800 fonts, 64 DAs, and any number of FKEYs and sounds.

You can group suitcases into sets, then summon all the luggage that belongs with a particular project at the click of a mouse.




*Can't remember the difference between Versailles and Monaco? Not to worry. Suitcase displays your typefaces right in the menu.*

Tips are optional. But here's one for those of you who find font ID conflicts even more irritating than running out of memory.

Get Suitcase. It eliminates them.

Call us at 1-800-666-2904. We'll tell you about our vaunted 24-hour toll-free technical support.

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So you can be sure this baggage will live up to its claims.




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ANDY IHNATKO

# Where to Buy a Mac



**Psst! Wanna buy a new Mac? Just be careful — the lowest price doesn't always guarantee the best deal.**

Somewhere on the Dead Sea Scrolls, it's probably written, "No matter how little you paid for a Mac, someone else probably paid less." As tight a rein as Apple has tried to maintain on the Mac market, there still exist many avenues for purchasing a Mac. Indeed, where you go can determine how much you blow.

Just in case you'd like to know the best and the cheapest place to buy a Mac (and they're not necessarily the same), I'm going to run through all the options. Where you decide to shop will probably boil down to whose money you're spending, how much you think you know about computers, and whether you would cheat on your income tax if you knew for sure that you'd never get caught.

***Brass and Glass.*** When you swing open the heavy glass door of a swanky urban computer dealer and nearly trip over the deep-pile carpeting, you feel like a *real* grown-up. By all means, enjoy the experience: the swanky location in the heart of the financial district, the chrome-and-glass furniture, the matching suits and haircuts on the salespeople. After all, you'll be paying for all of it if you buy a Mac here. The average Mac purchaser ought to avoid the Brass and Glass stores like the plague. If you're spending someone else's money, go right ahead; the B & Gs generally provide pretty good service and support. Unless you're interested in buying in multiples of five and purchasing extended service-and-support plans on top of everything else, though, they offer no real advantage.

***Mel's Computers 'n' Things.*** Smaller stores, catering to Decent Honest Folk rather than to businesspeople, almost always offer lower prices. They're usually located in smaller, out-of-the-way places where the rent's cheap and the neighbors don't mind unwashed Mac lovers dropping by at all hours. Prices are clearly marked, hardware is routinely discounted, and the staff is ordinarily more approachable and willing to talk about various hardware combinations.

Look for stores located near college campuses. They are defined by their customers: students and faculty, who generally are (a) very savvy and (b) nearly broke. Both bode well for the intrepid consumer.

All in all, the Mel category provides the best balance of low prices and good service for most consumers. I'm going to go ahead and tell you about places to buy Macs for even less, but each of them carries certain elements that, depending on your upbringing, may send you screaming into the hills.

***Superstores.*** A more recent development in computer marketing, superstores are mighty supermarkets for all kinds of hardware and software. That they sell huge volumes of just about everything and are generally located in unpolished warehouses translates into nearly rock-bottom prices on Mac hardware. The disadvantage of shopping at superstores is that although the salespeople tend to be just as educated on various bits of hardware as their counterparts in more-traditional stores, their knowledge can be spread pretty thin among several hundred products. Superstores are great places to shop if you're going to swoop in, make a purchase, and then swoop out. Just don't count on being able to get the answers to all your hardware questions there.

***Mail-order companies.*** Buying Macs through the mail has only one thing going for it: subbasement-level pricing. The monthly overhead of a mail-order company is nothing compared with that of a traditional storefront operation. Everybody knows that, including Apple. That's why Apple has refused to grant unto mail-order companies its highly coveted Authorized Apple Dealer status. Authorized dealers are fully equipped stores with fully equipped service departments. Mail-order companies are not. Macs sold by authorized dealers come with a full Apple warranty. Those sold by unauthorized dealers do not.

Read that last sentence again — yes, that means it's entirely possible that if your mail-order Mac does the big firework after only two months of operation, the cost of repairs will be your burden, not Apple's. The idea is to make things a bit more fair for storefront dealers; otherwise they'd be forced to, in effect, act as the mail-order companies' unpaid service departments. Many mail-order outfits offer their own warranties on the Macs they sell, but others leave you high and dry. Be sure to ask before you buy — the lack of a warranty can easily soak up any money you save by shopping mail-order. In addition, you might be responsible for shipping charges incurred while your Mac shuttles cross-country. For these reasons, I don't recommend buying new Macs via mail order.

***Special deals.*** Used and refurbished mail-

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order Macs sold by reputable companies are a different story; indeed, they can be some of the best deals anywhere. A used Macintosh IIci sold by an established reseller is generally just as good as a new one; the only thing you really lose in the deal is a warranty, but then again, this isn't new equipment. No matter where the Mac came from, you can haul it to any Apple service center for repair when necessary.

Also keep your eyes peeled in the business and auction pages of your local newspapers for notices of stores or businesses closing their doors. When the auctioneer is appropriately incompetent — and it happens often — it's possible to walk away with some spectacular hardware for a fraction of its true value. In all cases, make sure there's a legible serial number on the equipment. Just about the only kind of Mac an authorized service center won't service is the kind that looks like it's been stolen. They're kind of funny that way.

Many of you have probably been wondering when I'd start talking about educational discounts. Well, I'm talking about them last because (a) not everyone can qualify for the discount and (b) I'm about to suggest something sneaky and I'm hoping that some of you with power have lost interest and skipped to another column by now.

Yes, Apple has special educational pricing, available through school computer stores and bookstores, that allows teachers and students to buy brand-new, fully warranted Apple hardware at unbeatable prices. The only catch here — outside of the rather harsh requirement of having to go to school to qualify — is an agreement you have to sign promising not to sell or give away the hardware for a period of a year. "But I'm not a student," you're saying. Well, then — and here's the sneaky part — become one. See, buying a Mac at educational pricing usually just involves going to the campus computer store and flashing a valid student ID card. Apple wants you to flash a full-time-student-ID card, but many colleges grant part-time students the same boon. So here's what you do: Stop in at a college's computer store and ask about discounts for part-timers. If it's a go, cross the campus and pick up a night-course catalog; sign up for an $80 night course in pottery; and as soon as your ID card comes in the mail, use it to buy a $7,000 IIci system for $4,000. (Inspirational credit — Steve Jobs' one-word reply when asked how nonstudents could buy the original education-only NeXT machine: "Enroll.")

### Parting Shots: CheckFree

Reaction to September's column on CheckFree ("Check It Out," page 29) was swift and varied. Many satisfied CheckFree users, writing from homes they didn't lose due to a vanished mortgage payment, voiced their strong support of the CheckFree electronic checking service, reporting that they have been using the service for eons and have had nothing but happy interludes with electronic checking. Just as strong were the messages from former CheckFree users who contributed their own horror stories of unpaid bills and angry creditors and laid the blame squarely at CheckFree's feet. To be fair, some of the reported problems were the direct result of the user's failure to follow CheckFree's instructions properly, but most were not.

Folks also wrote to correct my assertion that CheckFree was too expensive. Simple multiplication reveals that if you pay more than ten bills a month electronically, CheckFree pays for itself with the money you save on postage alone. Others reported that electronic bill payment was already available via touch-tone phone from their local banks, for free in some cases.

Finally, a CheckFree vice president sent me a nice letter thanking me for being fair and balanced in my appraisal. Because he didn't see my name on CheckFree's list of registered users (for my investigations, I used the CheckFree account of a friend whose finances were considerably more complicated than mine), he offered to give me six months' worth of access for free, to become more familiar with the service. Fair enough. The next paragraph was far more interesting: If my views still hadn't changed after six months — read this next bit three times (I certainly did) — CheckFree would pay all my bills for one month, up to $2,500 worth. I am reporting this without comment. Oh, by the way, he sent me another letter a few days later, asking that I keep his offer under my hat. So don't tell anyone about it, OK?

As always, your feedback is appreciated. Send comments, corrections, information, opinions, or your reaction to the new syndicated "Batman" cartoon to me in care of *MacUser*.

# Here's a little flavor from Aatrix Software...



Aatrix Software announces the arrival of CheckWriter 4/0 and PayCheck, two new software ideas that will make your mouth water! CheckWriter 4/0 is an exciting personal and small business finance software package... the most fully featured for the Macintosh! PayCheck is a comprehensive payroll program focused on one idea... simplicity.

Link CheckWriter 4/0 and PayCheck together and you have a flexible tool for complete financial and payroll management. Use them separately and discover their individual power and ease of use.

Here's just a sample of what CheckWriter 4/0 & PayCheck will do for you!

Use CheckWriter 4/0 ($79)* for all your personal finance or small business finance needs.

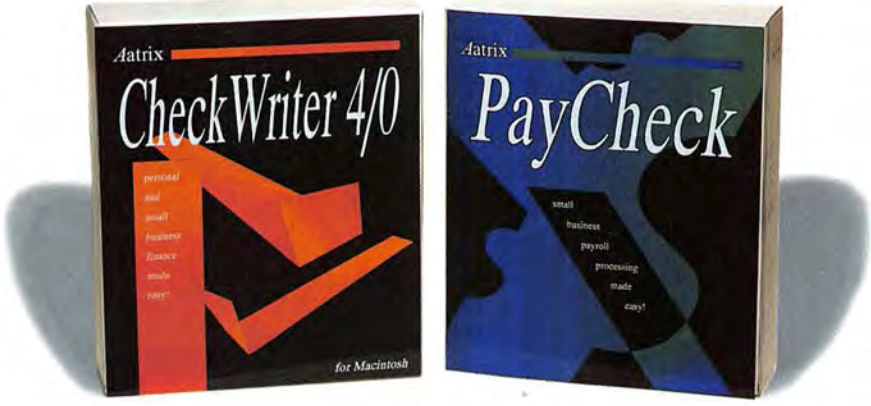
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Is there a sports enthusiast on your list? Give them the **Trivial Pursuit, Sports Edition**. It will challenge their sports knowledge daily with six **Sports** questions. It also features a new, more versatile and even easier-to-use full-functioning daily planner.

Don't know what to buy for someone? Just about any Macster would love to find a copy of Gary Larson's **The Far Side Computer Calendar** in their stocking. The latest edition of this wildly popular perpetual calendar features a new collection of 365 cartoons, including one in color every week. Don't miss the one that shows what would happen to cats if you crossed an aardvark and a dog!

#05072 Cathy Daily Planner 2.0 ..... $48
#04706 The Far Side Computer Calendar 2.0 ..... $48
#06168 Trivial Pursuit, Sports Edition Daily Planner 2.0 ..... $48




$114

## Reunion

*MacUser* calls Reunion, "...one of the nicest genealogy programs....The various cards link intelligently and automatically. Using Reunion is easy and data entry is logical. The program includes space and tools for adding digitized photos as well as an index and birthday file." Leister Productions #05984




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## ACT! for the Mac

ACT! for the Mac keeps up-to-the-minute files for all your contacts—with fields that can be customized, date-stamped notes and a comprehensive history log. The activity scheduler, with graphical day, week and month views, lets you schedule unlimited calls, meetings and to-do's. Comes with word processor and spelling checker. Contact Software #06231




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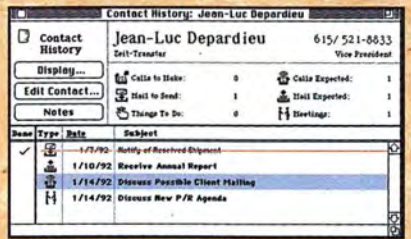
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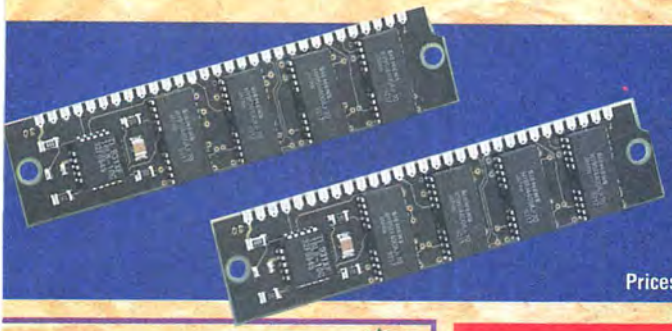
Dynodex™ is the original, all-in-one address database that manages and prints your addresses right from your computer. Use Dynodex™ every day to quickly find and update important contacts, dial the phone, then print your addresses directly onto standard organizer-size paper (included) Just insert and go. Portfolio Systems #00119

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| Classic with adapter | Classic | 2 | 2 | 1 | 03824 | $ 88 |
| | Classic | 2 | 4* | 1 | 05653 | $ 66 |
| Classic II LC/LC II | Classic II | 2 | 4 | 1 | 05653 | $ 66 |
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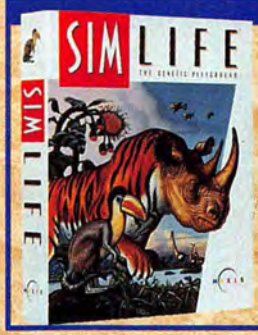
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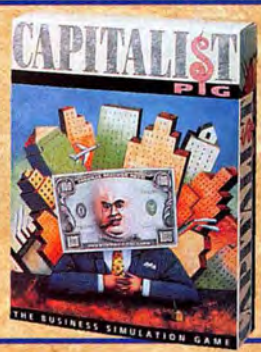
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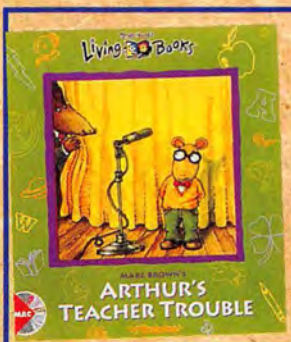



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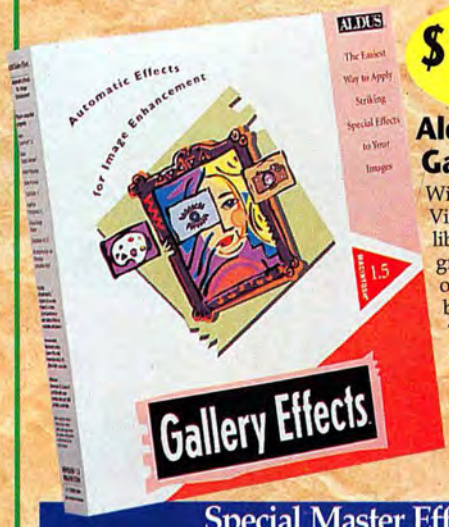



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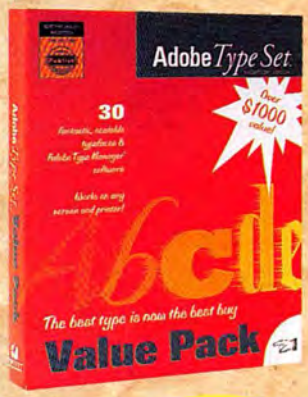
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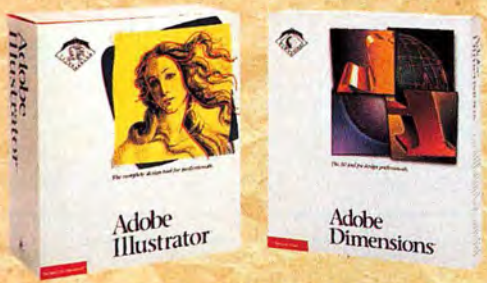
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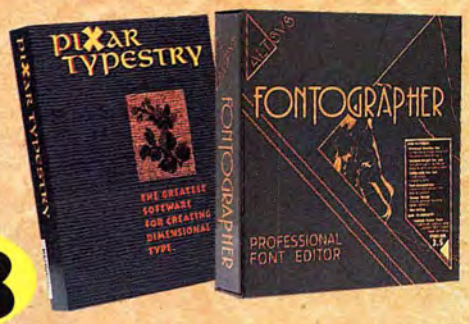

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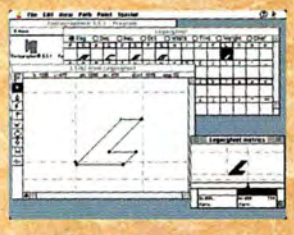
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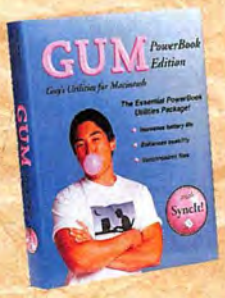



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PowerMerge solves the problem of keeping track of changes made to your files while working on your PowerBook. It simply and automatically synchronizes files between your PowerBook and your desktop Mac. It also features: notification if files have been changed on both computers since the last update, history log of updates, include/exclude by file.

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## Guy's Utilities for the Macintosh—PowerBook Edition (GUM) — $58

This invaluable collection of 10 utilities serves three main purposes: they increase battery life, enhance usability and reconcile files between the PowerBook and a Desktop machine. Priced at just $64, GUM contains the functionality of multiple products for the price of one! You save more than $100 off the cost of purchasing comparable products separately. After Hours Software **#06166**




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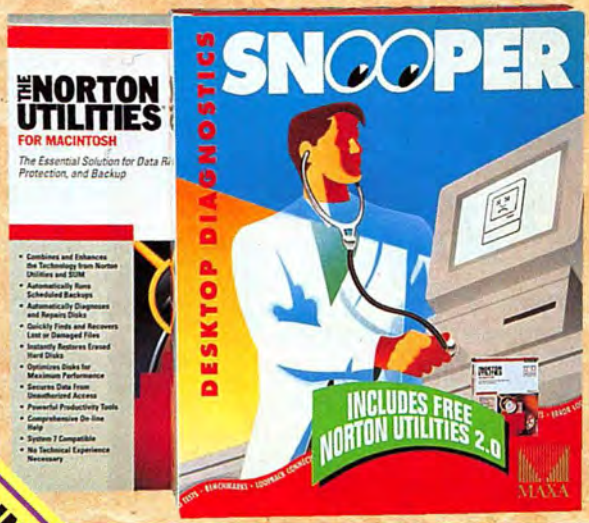
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Microcom Value Pak (MVP) is a collection of the complete Microcom family of essential utilities for the Macintosh. All the utilities a Macintosh user needs are now available in MVP at one great price. MVP includes Virex, 911 Utilities, Complete Undelete, Citadel with Shredder and Carbon Copy for the Mac. Microcom **#05046** ❷ ✓

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There are three models available: Gold—14,400bps data, 9600bps fax send, 9600bps fax receive; Silver—9600bps data access, 9600 fax send/receive; Bronze—2400bps data, 9600 fax send, 4800 fax receive. Global Village

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MacIntercomm is one of the fastestfile transfer programs available. It offers true multitasking with invisible file transfers. It also comes with a scripting language with built-in editor and automatic script recorder that automates tasks. Other features include Xmodem, Zmodem, Kermit, B-Plus, VT220, full 16-color PC-ANSI, AutoDial and a SmartDial feature for traveling users! Mercury Systems, Inc. #06098

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The SupraFAXModem V.32 offers a complete 9600bps data/fax solution for Macintosh computers. Includes modem cable, Microphone 1.6 communications software, FaxSTF fax software and free sign-on kits for Compuserve and America On-line. 5-year manufacturer's warranty. Supra #00413

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$148

Communicating online has never been easier, especially now that MicroPhone II is Apple System 7 Savvy. MicroPhone II has some of the best scripting tools in the business, friendly front ends to remote services, new VT320 and VT220 terminal emulation, faster screen speed and Apple PowerBook support. According to MacWEEK, "MicroPhone II 4.0 is a robust telecommunications product, with plenty of features and an interface that just keeps getting better. It is as simple or complex as your needs demand, and it comes at a reasonable price." Winner of MacWEEK's Target Award for telecommunications and consecutive World Class Awards from MacWorld. Now Apple System 7 Savvy!

Take a peak into the future of online interactive communications with the award-winning MicroPhone II. The breakthrough technology of Loran lets you actually connect to different services through the same graphical interface, making MicroPhone II your information valet. E-mail, connecting to remote services, transferring data—no other communications software does it as elegantly as MicroPhone II. Software Ventures #04893 ❷ ✓

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| Personal Microphone #06244 | $44 |

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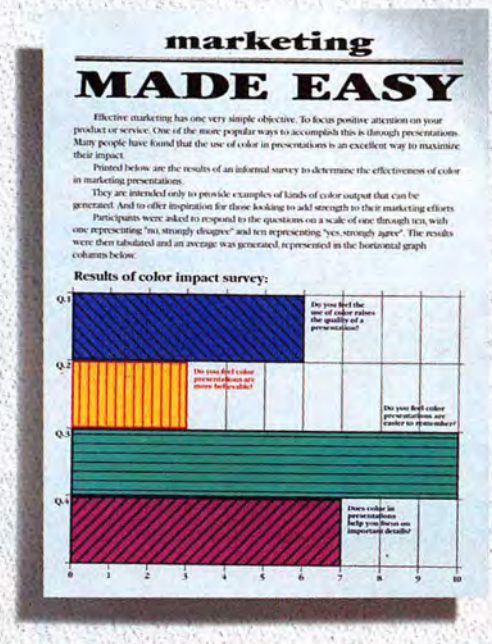
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# Taking License



**Warning: Your backup program may be breaking the law. Welcome to the world of software licenses.**

All commercial software is protected by copyright law, but most software also comes with something called a license agreement, which you supposedly agree to when you tear the cellophane off the package. Why do software vendors need two kinds of protection?

Don't ask me. All I know is that when you examine these license agreements closely, you get the strong impression that even the software vendors don't know what they mean.

Copyright law is basically reasonable, pretty understandable, and very restrictive. Loading a program onto your hard disk or even loading it into memory is copying and, technically, a violation of copyright unless the copyright owner explicitly permits it. Copyright law reserves all rental, leasing, and public-display rights to the copyright owner. Penalties for copyright enfringement include statutory damages as high as $20,000 per infraction and as high as $100,000 if the infraction is willful. Damages and seizure of profits are a possibility, and willful infractions are also subject to federal criminal penalties, including fines and as much as a year in prison.

So if copyright law is so restrictive and if violations carry such stiff penalties, why do software vendors need license agreements?

License agreements make the most sense when you look at them historically. Two decades ago, before there were personal computers, software was normally supplied by the same company that supplied the computer. Software was a follow-on service, viewed much like maintenance. Software was a service, not a product, and the license agreement was really a service contract.

### The Shrinkware Stretch

Today's shrink-wrap license agreements represent an attempt to stretch that model to fit today's rather different software market, in which a program is a product you buy from a third-party vendor in a store or by mail order and in which software support is often limited to notification of upgrades. It's quite a stretch, particularly in the claim that what once was handled by a written contract is now handled by the ripping of cellophane.

That little rip implies a lot: It implies that you have read, and understand the legal ramifications of, the contract. It implies that you know the relevant covering laws of the state of, say, Iowa (if you use MicroFrontier's software) or are familiar with English law (in the case of software from ComputaLabel Ltd.). And it implies that you understand any sublicense restrictions, such as the prohibition against using certain Apple utilities licensed to Aldus with any program except PageMaker. CE Software's license agreement enjoins you to take appropriate steps to protect CE's trademarks, trade secrets, and other property rights related to the software, so tearing CE's cellophane implies that you know what these rights are and know what steps on your part are appropriate to protect them. Are you still with me?

License agreements aren't all restrictions; they actually grant some rights. Because copyright law prohibits even necessary copying, some statement is required to clarify what copying rights the vendor does grant users — rights that allow them to use the software as the vendor intended: load it into memory, copy it to a hard disk, make backups. License agreements try to do this, but they don't always succeed.

What license agreements in fact do is often senseless and not in the best interest of either users or vendors.

Take the question of home use. At least one survey I've seen says that most users take their work software home and that they believe they should have the right to do so. Well, of course they should. Anybody not engaged in marketing software can see that. Software vendors need to realize that customers who take work — and work software — home with them are their best customers. They need to encourage users to use their work software on their home machines or their portables. Aldus and Kiwi Software, for example, do exactly that, with the reasonable proviso that the software not be used on more than one machine simultaneously.

Most vendors, though, require users with more than one machine to purchase a separate copy of the software for each machine. These vendors take the view that they sell software to machines rather than to people. You would think that a glance at the signatures on the checks would make them wise up, but I suspect that a lot of vendors won't catch on until those checks stop coming in.

### Backup Zingers

One of the oddest restrictions in software licenses is the limitation on backup copies. Copyright law doesn't automatically allow

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you to make any copies of the software you purchase, so vendors must explicitly grant you the right to make backup copies. For reasons unknown to me, software vendors are almost unanimous in allowing their customers to make only one backup copy of a program. Kiwi Software is better than most, allowing two. Many vendors, including Microsoft and Aldus, allow you to make one backup copy or to load the software onto a hard disk *but not both*. Studiotronics specifies backup *diskettes*, implying that backing its programs up to tape, say, would be illegal. I've read and reread WindowCraft's license agreement, and I swear it doesn't allow you to make any backups at all, although you can load the software onto your hard disk.

How are you doing so far? No license violations yet? I trust that you back up your hard disk regularly, using one of the many excellent backup programs that can be counted on to violate several license agreements at once.

The fact is, one backup copy is not enough. Disks do go bad. Software companies do go out of business. The time required to get a replacement copy from the vendor may be too long. So how many backup copies do you need? That's not for me to say. It's not for Microsoft to say either.

Why on earth are software vendors trying to dictate how secure your backup policy should be? To be fair, that's not what they have in mind. They just want to prevent you from copying their software for use, a clear violation of copyright, but it's easier for them to count disks than to prove illegal use. So is this limitation a necessary evil? No, there are companies — the aptly named Right Answers, for example — that don't place any restrictions on the number of backup copies you may create.

Of course, no vendor allows you to make copies of commercial programs for other people, whether you charge for them or give them away. That's a violation of copyright. But surely you can sell or at least give away the program if you are careful to transfer all the disks, manuals, cellophane-embossed contracts, and so on? Copyright law doesn't restrict your right to transfer ownership of your copy of the copyrighted work.

Ah, but license agreements are not so unanimous on the issue. Some companies allow transfer without restriction. Some, such as Multi-Ad Services, don't allow any transfer at all. Some, such as Letraset, require you to get the written consent of the vendor before transferring. Why the difference? Beats me.

There's a wealth of such nonsense in license agreements, such as the question of who owns the disks. Most vendors claim to retain ownership of the software but grant that you have purchased the disks on which it resides. Some, including Adobe and Studiotronics, claim to retain ownership even of the disks. One agreement seems to claim ownership of *your* disks if you use them to make backup copies of the company's software, but I'm probably misreading it.

It is clearly not in users' interest to have to keep track of such a mishmash of restrictions. And the fact is, it's completely unnecessary. Many software vendors do without license agreements, relying on copyright law. Borland puts it clearly enough that you would think even other software vendors could understand its "No-Nonsense License Statement":

"This software is protected by both United States copyright law and international treaty provisions. Therefore, you must treat this software just like a book, with the following single exception. Borland International authorizes you to make archival copies of the software for the sole purpose of backing up our software and protecting your investment from loss." License *statement*, you'll notice, not license *agreement*. It's simply an explanation of the law and an authorization to make backup copies. No number specified.

This policy doesn't seem to have hurt Borland any.

Unfortunately, users can't simply ignore license agreements. Although the things can be redundant, senseless, offensive, and inconsistent, they can also be enforced. And it is not safe to assume that only the sensible provisions will be enforced.

Yes, software licenses are needed: Licenses are appropriate for multiuser products. Site licenses make sense. Development tools require that there be some agreement regarding the products created with them. And there are other cases. But shrink-wrap license agreements on single-user products are unnecessary and are annoying and insulting to customers. They've got to go.

I suggest a New Year's resolution for the software industry: Kick the shrink-wrap license habit.




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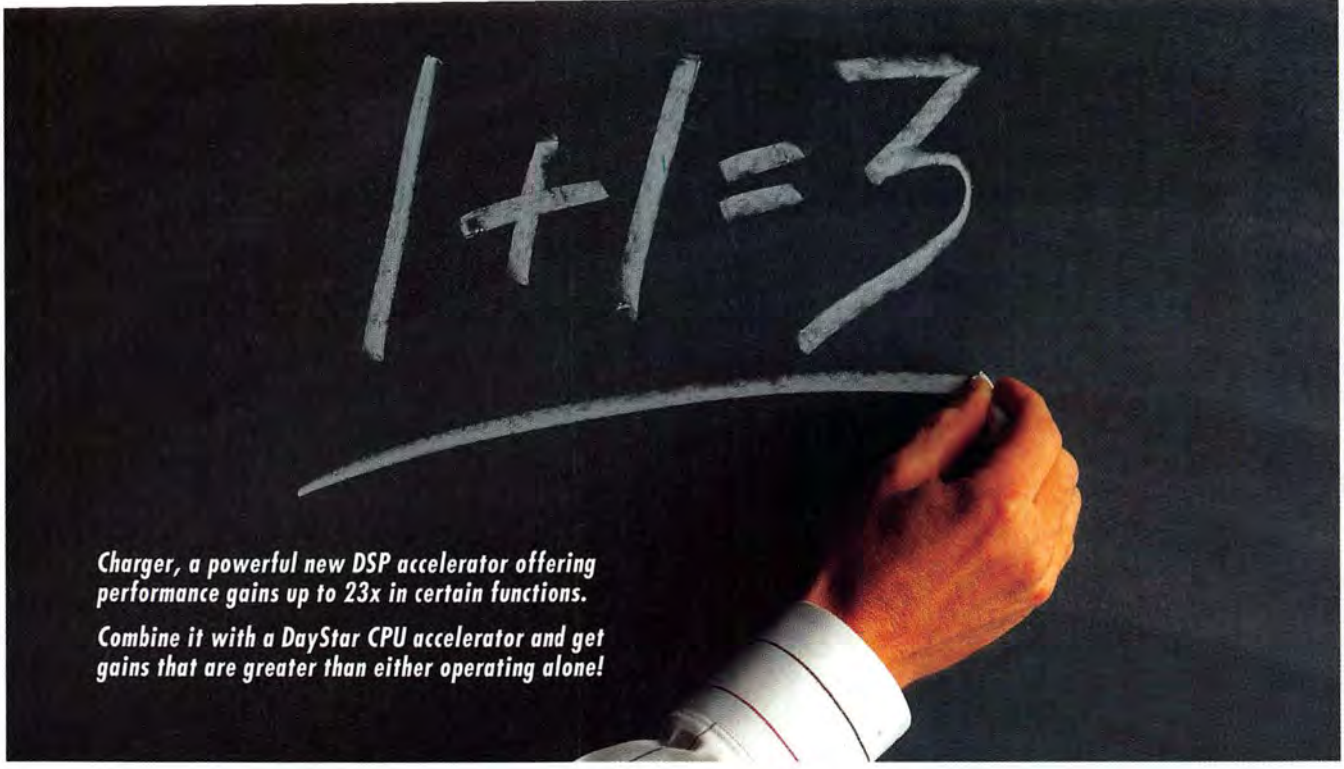
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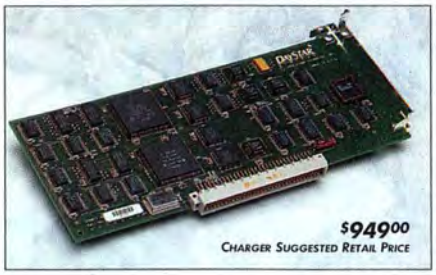



# New math for Adobe Photoshop™ users... introducing Charger™ from DayStar.

If you work with Adobe Photoshop, you probably have a need for speed. DayStar now offers two powerful upgrades that can be combined for even more speed. That's the new math from DayStar — one plus one does equal three...

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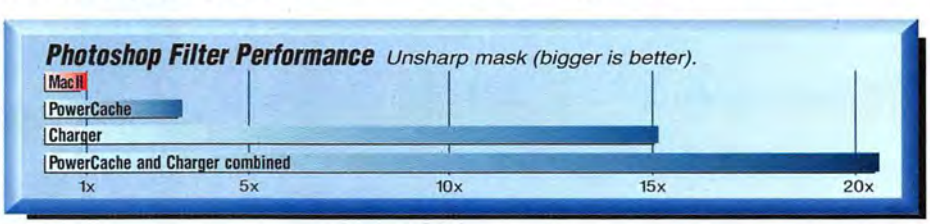
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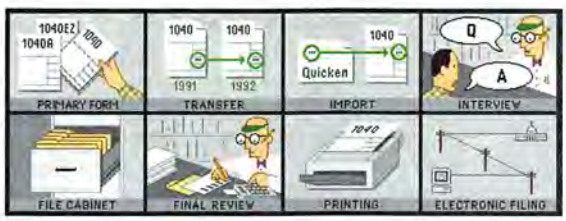
# NEW ON THE MENU

Sight and sound: Graphical interfaces are great, as long as you can see them. Fortunately for blind or sight-impaired Macintosh users, Berkeley Systems (510-540-5535) has introduced new, System 7 versions of outSPOKEN ($495) and inLARGE ($195). outSPOKEN can pronounce menus, desktop items, and dialog boxes, and inLARGE magnifies the screen 2 to 16 times.

**By Russell Ito**




**Death and taxes:** The new year is upon us, and that can mean only one thing (no, not the resurrection of Guy Lombardo): tax time. **TaxCut** ($49.95), from Meca Software (800-288-6322 or 203-256-5000), is a new challenger in the tax-preparation-software market. Following the "interview" paradigm that TurboTax pioneered some time ago, TaxCut guides you through the process of filling out your tax returns by having you answer a series of questions. As you answer the questions — questions that are increasingly specific, based on your previous answers — TaxCut compares your totals with national averages and alerts you to anything the IRS might find suspicious. The program can import your financial data from Intuit's Quicken and, as you'd expect, from Meca's Managing Your Money. **MacInTax** ($79.95), from ChipSoft (619-453-4446), is the latest version of the Mac's oldest tax package. Last year, MacInTax adopted the TurboTax interview approach, but the integration of the two technologies wasn't especially smooth. This time, the company has smoothed things out, so, for example, the interview process now focuses the questions based on your answers instead of just feeding you questions that aren't pertinent. Electronic filing has also been simplified, because MacInTax now includes the filing software. TaxCut and MacInTax are available in head-start editions, so you can plan early and then automatically upgrade to the final versions of the programs, with all the final IRS forms, in January or February. Both Meca and ChipSoft are also offering accuracy guarantees, so if the IRS finds a calculation error, each publisher agrees to pay the IRS penalties (Meca will also pay the interest). Happy New Year.




## Up to Date . . .

**DayMaker,** Pastel Development's monster PIM, has been boosted to version 2.0. New features include recurring events, to-do lists, and a plug-in architecture for greater functionality. 800-727-6732 or 212-941-7500. $129.95. **Frontier 2.0,** the latest version of UserLand Software's scripting package, supports the Apple-event Object Model, so it can automate and customize such programs as FileMaker Pro 2.0 and Excel 4.0. 415-369-6600. $249.

## A Colorful IBM Printer

Who would have imagined this? IBM has produced a colorful product. The IBM Color Jetprinter PS 4079 is the latest entry in the printer market from Lexmark, IBM's former printer division.

A color inkjet model, the Jetprinter uses a 16-megahertz AMD 29200 RISC chip as its processor and boasts 360-dpi resolution. PostScript-compatible, it has 4 megabytes standard and can be boosted to 16 megabytes. By using four ink cartridges (cyan, yellow, magenta, and black), it can print documents with color and with monochrome elements without compromising the quality of the blacks. With a black cartridge, your text won't have the muddy look that often results from process blacks. You'll also save ink, because you'll use only the black cartridge for text documents.

The Jetprinter can handle a range of paper sizes, from a standard #10 business envelope to an 11-x-17-inch tabloid-sized page. Although it can print on plain paper, as can any inkjet printer, coated paper will probably produce the best results.

Lexmark has outfitted the Jetprinter with parallel, serial, and LocalTalk ports, and the printer can automatically switch between its PostScript and GL emulations.



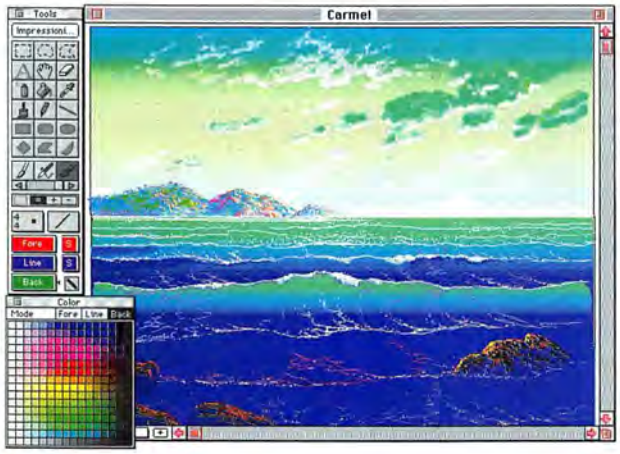
**Color from Big Blue! Lexmark's IBM Color Jetprinter PS 4079 is the company's first color printer for the Mac. It's a 360-dpi, PostScript-compatible inkjet printer that can print tabloid-sized images.**

Lexmark International, Inc., 740 New Circle Road, Lexington, KY 40511; 800-426-2468 or 606-232-2000. $3,495.

## BrushStrokes: Claris' Clear Choice

Audio-CD buyers are familiar with the concept of "second label" marketing, the use of a budget label to sell discs with a narrower appeal. Now that same marketing approach has come to software. Claris has launched a second-label line, Clear Choice, which will offer a range of cross-platform, personal applications, and utilities (for the Mac, Windows, and PDAs) that will be priced in the $50-to-$200 range. Independent developers will create these packages, and Claris will then publish them under the Clear Choice label. Claris will not acquire the products, however, so the developers will retain control over them while taking advantage of Claris' worldwide marketing. Users will be able to buy the Clear Choice products wherever they buy other Claris programs. Claris will handle all the technical support for the line.

The first Clear Choice package will be a 32-bit painting program tentatively called BrushStrokes. Unlike high-end painting packages, BrushStrokes is designed for nonartists, so it provides a variety of tools for creating specific effects quickly, including an Impressionist paintbrush, a rubber-stamp tool, and support for Photoshop and Aldus Gallery Effects plug-ins. In addition to the painting tools, BrushStrokes offers image-manipulation and -processing tools, including filters for sharpening, embossing, smoothing, and special effects. It also lets you do color remapping; inversion; and transformations, such as rotations, flips, skewing, and slanting. In a sense, BrushStrokes is like an advanced Kid Pix for adults. BrushStrokes starts from the assumption that its users aren't artists, and the package comes with an extensive step-by-step guide showing how to create various types of images.




**BrushStrokes, from Claris' new Clear Choice line of budget programs, is a 32-bit painting package for nonartists — sort of a Kid Pix for adults.**

Although BrushStrokes will be the first new Clear Choice package, Claris will also ship Retrieve It!, a file-finding utility, as another Clear Choice product. Retrieve It!'s developer, MVP Software, has been selling the package since its introduction last June.

In the first year, Claris plans to ship four to six programs under the Clear Choice banner. Future Clear Choice products will focus on these areas: graphics, utilities, Claris-product extensions (such as add-ons for FileMaker Pro), PIMs, entertainment, and education.

Claris Corp., 5201 Patrick Henry Drive, Santa Clara, CA 95052; 408-727-8227. BrushStrokes, $129; Retrieve It!, $69.

## Keeping InTouch

A free-form database manager, Advanced Software's InTouch was among the first PIMs released, but it's been a long time since it made any news.

Version 2.0 includes reminders; a list view; more printing options; and grouping, which lets you categorize your contacts in any way you like.

But the new InTouch's best feature is Snap, a utility that sits in the background and makes addressing a letter and printing an envelope easy. When you type a name in your word processor, highlight it, and press a hot-key sequence, Snap automatically looks for the unique occurrence of that name in your InTouch database. It then retrieves the complete address, formats it, and pastes it into your letter.

Advanced Software, Inc., 1095 E. Duane Avenue, Suite 103, Sunnyvale, CA 94086; 408-733-0745. $99.95.




**The latest version of InTouch, Advanced Software's PIM, includes reminders, to-do lists, and a list view that makes scrolling through your phone book easy.**

## SuperMac's Color Proofs

Continuous-tone dye-sublimation printers are catching on, and now another first-time printer vendor has joined the fray. SuperMac Technology has introduced the ProofPositive line, which boasts exceptionally fast speed and color accuracy that's intended to eliminate the need for color proofs.

The ProofPositive line consists of two models: the Full-Page Printer and the Two-Page Printer. The former can print on paper as large as letter-sized, and the latter can print on as large as tabloid-sized (11 x 17 inches). Each is a 300-dpi, Adobe PostScript Level 2 (optional), full-bleed printer, and SuperMac estimates that each has an average printing time of 3 to 7 minutes per page. The consumables come in three varieties: gray scale, CMY, and CMYK.

For color accuracy, the ProofPositive models include built-in color-matching software: Electronics for Imaging's EfiColor, which SuperMac predicts can render an accurate color proof that matches the results from a color press. And for the fastest printing, SuperMac includes a Photoshop plug-in that lets you export images directly to the print engine.

The ProofPositive printers connect to a Mac through either a NuBus card or the SCSI port. For sharing the printers over a network, SuperMac includes QuickDraw Chooser drivers that let you use a Mac as a pass-through print server.

SuperMac Technology, 485 Potrero Avenue, Sunnyvale, CA 94086; 408-245-2202. Full-Page Printer, $6,999 to $10,499; Two-Page Printer, $19,499 to $19,999.



**The ProofPositive line of continuous-tone printers from SuperMac Technology boasts full-bleed prints as large as tabloid-sized, with color accuracy that can match that of a color press.**

# NewsLine

**Reports and Analysis**

### PowerBook 100 Recall

CUPERTINO, CA — Just as it was quietly slipping off the Apple price sheet, the much maligned PowerBook 100 was hit with more bad news: a product recall. Apple Computer has announced a recall of some 60,000 early PowerBook 100 units that might have an electrical short that can melt a small hole in the bottom of the PowerBook case. The affected models' serial numbers are less than SQ211xxxxxx and less than SS216xxxxxx. Units with serial numbers equal to or greater than these aren't affected, and no other PowerBook models are affected, because the 100's components are unique. In order to make the repair process easy, Apple has established a toll-free hot line: 800-572-1731 (9 A.M. to 8 P.M. EDT, Monday to Friday). To receive a no-cost repair, users must just call the number and have the serial number confirmed, and Apple will arrange for an overnight pickup and return.

### Microcom Dumps Utilities

NORWOOD, MA — Microcom has decided to amputate its utilities group. The company, which is publisher of Virex, Carbon Copy, 911, and Complete Undelete, has announced that it will sell its utilities group to Datawatch. For its first fiscal quarter of 1993, Microcom reported a loss of $6.6 million, including a charge of $5.8 million to cover the cost of restructuring.

### Claris Intros HyperCard Player

SANTA CLARA, CA — HyperCard without HyperCard? That's the idea behind Claris' introduction of HyperCard Player, a run-time version of HyperCard that lets users run a stack without being able to alter it. HyperCard Player will be bundled with the Performa line and will replace the version of HyperCard that ships with all other Macs. Claris will offer a HyperCard Developer's Licensing Kit ($349), which includes a license to duplicate and distribute an unlimited number of copies of HyperCard Player. HyperCard Player will not be available free through BBSs or user groups unless a user group buys the Licensing Kit. HyperCard Player can be purchased from Claris for $29.

INTEGRATED SOFTWARE

# Microsoft Works 3.0

**Works scores high with its new interface and charting features but fumbles at module integration.**

For Microsoft Works, 3 seems to be the magic number. After a 3-year wait, version 3.0 of Microsoft's integrated-software package has finally emerged. When Works was first introduced, it enjoyed huge success as the only player in the integrated field, but the landscape has changed significantly since then. Microsoft's newly enhanced entry now faces stiff competition from 3 other integrated packages — GreatWorks, ClarisWorks, and BeagleWorks. We found Microsoft Works 3.0 a worthy competitor, but the package is no longer assured victory, particularly with the relatively weak level of integration it offers among its modules.

### New Look

The most obvious change to Works is its flashy new interface. All the basic interface elements, including the ruler and the new floating tool palette, appear in 3-D gray scale. The enhanced palette boasts icon buttons for handy access to features such as font-formatting commands that formerly were available only from menus or the keyboard. The tool palette is context-sensitive, so its selection changes as you switch from one module to another. Works 3.0 also supports 256 colors throughout all of its modules.

But Works' enhancements go far deeper than a simple face-lift. Microsoft has significantly beefed up the feature sets of the package's word-processing, spreadsheet, database, and communications modules. In addition, Works 3.0 features a new Draw module with page-layout capabilities.

Works' word-processing enhancements include new ruler buttons for tabs, justification, and line spacing as well as support for footnotes and endnotes. The word-processing module lets you create true multiline headers and footers (this feature is available from within *any* module), but they're visible on-screen only in Works' noneditable Print Preview display. Mail-merge is also easier. The only key feature missing from the Works word processor is a set of column-formatting commands.

The Works spreadsheet module now permits separate character-style selections for each cell, although you're restricted to a single font and size for each document. In addition, the software automatically recognizes date and time formats. Other spreadsheet-module strengths include support for cell notes and for split windows, so you can view several parts of a large spreadsheet simultaneously.

### Improved Charting

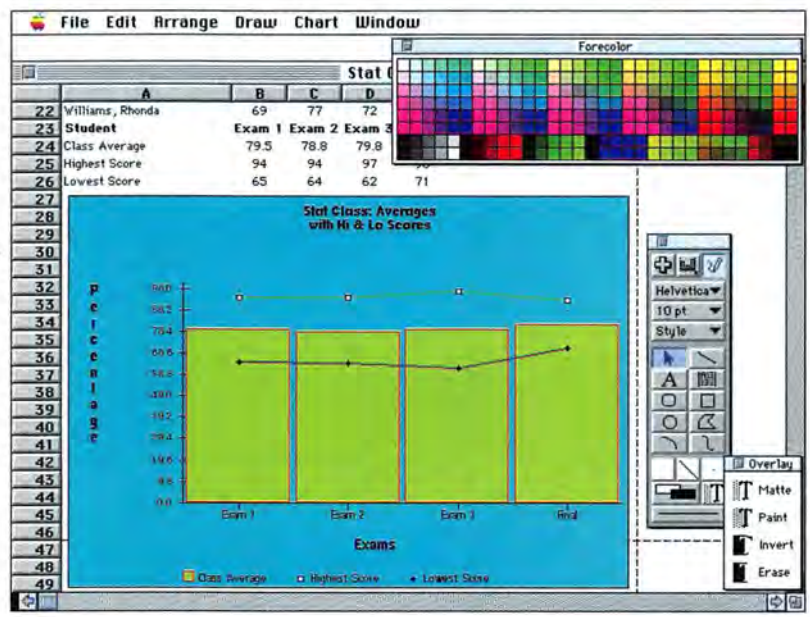
Charting features, once a major Achilles' heel of Works, are now a standout. Version 3.0's charts are better-looking and easier to construct and modify than those of previous versions. Especially noteworthy is that Works 3.0 allows you to edit individual chart elements, such as legend boxes, at any time with a new Touch Up command. Of course, links with spreadsheets are preserved. In addition, chart handling is improved — charts now appear with their spreadsheet, not in separate windows, so you can move them around easily within the spreadsheet document as well as print them along with their spreadsheet.

### Database Enhancements

Microsoft has made forms design easier in the Works database module by allowing separate design and data-entry modes. Moreover, you can create forms with filters composed of as many as six record-selection rules. Once you've named a filter, you can save it with the database. Each database document can have as many as 16 named filters. Version 3.0 allows for more flexibility by letting you resize each field to accept multiple lines. However, the module is still hampered by a spreadsheetlike data-entry bar, which doesn't let you enter data directly into a forms field.

The Works communications module is now based on Apple's standard Communications Toolbox. The module's best new feature is the Sign-on command, which helps automate log-ons to frequently accessed information services by recording keystroke sequences and saving them as scripts.

Like previous versions, Works 3.0 provides a drawing-tools palette that's available in every module except the communications one. When you draw




**Microsoft has significantly enhanced Works. Especially noteworthy are version 3.0's charting features — charts now appear with spreadsheets rather than in separate windows, and they're easier to edit.**

an object with a tool from this palette, it's placed in a transparent layer that sits on top of your document. The palette — which provides many excellent tools — features several new enhancements, including 3-D effects and shadows. However, a much-needed alignment tool is still missing.

### Multipage Support

Works' new Draw module features a Page menu that lets you create multipage documents such as newsletters. Like previous versions, Works 3.0 lets you link text frames so that text flows from one frame to another. Version 3.0 enhances this feature for multipage documents by adding buttons to each frame. The buttons provide a fast and easy way to create new links as well as to jump from one frame to the next.

Unfortunately, you can't wrap text around graphic borders, which is an important feature for newsletter design. In addition, paragraphs within text frames don't support tabs or separate justifications. Worst of all, we encountered a bug that caused some of the text within a frame to temporarily vanish when we inserted the cursor near the bottom of the frame. Works also suffers from a delayed response to Cut commands and some annoyingly slow screen redraws.

These imperfections are frustrating, but what's most disappointing about Works 3.0 is its relative lack of integration. When all is said and done, the package's ubiquitous drawing-tools palette, which lets you combine graphic and word-processing elements without cutting and pasting, is its only integration vehicle. Incredibly, even the Works spelling checker and newly added thesaurus are active only in the word processor.

The Works package includes excellent on-line help, a healthy assortment of sample templates, and a selection of DataViz converters for translating files.

### The Bottom Line

If you're looking for a package that provides well-engineered integration among its modules, you won't be impressed with Microsoft Works 3.0. However, if you are looking for the best integrated-software bargain on a module-by-module basis, Works fares better. The spreadsheet module, with its impressive charting features, is probably the strongest of all the integrated packages'. The Works word processor can't match the section divisions and text-wraparound effects of the BeagleWorks word processor, but except for the lack of column-formatting commands, the module is generally comparable with ClarisWorks' and GreatWorks'. Moreover, only GreatWorks can compete with the Works drawing-tool selection, although GreatWorks lacks linked text frames. Works' database and communications modules are easily competitive with those of the other packages, and its good-looking interface is a decided plus.

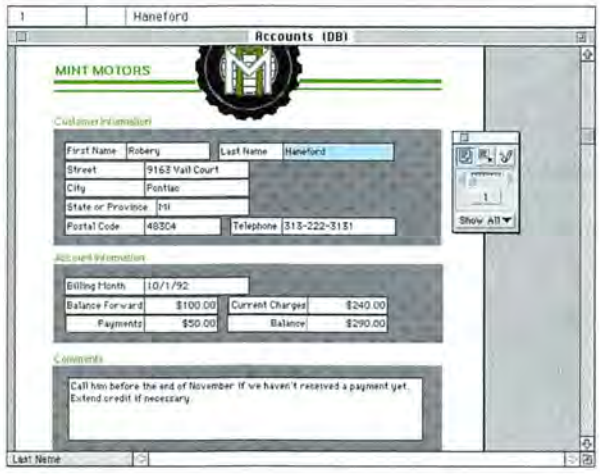
Overall, if you discount the importance of module integration (ClarisWorks is the clear winner here), the race comes down to Microsoft Works and GreatWorks. We give GreatWorks the nod for providing the most features — it's the only integrated package that provides both an outliner and a painting module. And although both packages share a similar tool palette, GreatWorks tops Microsoft Works with its publish-and-subscribe support, full formatting controls for text frames, and a spelling checker and thesaurus that work across modules.

However, if ease of use and multipage-document controls are at the top of your list, Microsoft Works represents an attractive bargain. And if you're currently using Works 2.0, the package is well worth the $79 upgrade price.

— Ted Landau




With Works' newly added Draw module, you can create multipage documents with the Page menu. Linked text frames allow text to flow automatically from one column to the next.




The Microsoft Works database module now supports multiline fields and separate data-entry and design modes, but you must still enter data with a separate data-entry bar — you can't type directly into forms fields.

## Get Info

**Microsoft Works**

★★★★

**Published by:** Microsoft Corp., One Microsoft Way, Redmond, WA 98052; 800-426-9400 or 206-882-8080.
**Version:** 3.0.
**List Price:** $249.

NETWORKING

# cc:Mail 2.0

**Refurbished from bow to stern, Lotus' E-mail system makes for smooth sailing on mixed Mac-and-PC networks.**

If you long ago wrote off cc:Mail as a contender in the Mac E-mail arena, get your pen out again — version 2.0 can go head to head with the Mac's leading mail systems, QuickMail and Microsoft Mail. Although the first version of cc:Mail for Macintosh looked like a poor relative of its highly successful DOS counterpart, version 2.0 boasts a slick graphical interface, advanced features unavailable from any other Mac E-mail system, and superb Mac-to-PC mail connections.

### Good-Looking Client

Compared with the first version's drab, text-based client software, cc:Mail 2.0's interface is downright eye-catching. Colorful icon buttons provide easy access to all the basic mail functions, and you can custom-configure the list windows that contain messages, addresses, and folder contents. By clicking and dragging items such as messages and user names, you can easily move them from one window to another.

Like other mail systems, cc:Mail 2.0 lets you enclose files (as many as 20 items) with your messages. But what's unique about cc:Mail is that it lets you view enclosed files you receive (or play them, in the case of sound files), before you download them to your hard disk. This feature works with text, sound, graphics, QuickTime, fax (to send and receive faxes with cc:Mail, you need the $1,995 cc:Fax add-on), and application-specific files.

For application-specific files enclosed with messages, cc:Mail automatically launches the appropriate application when you double-click on the enclosed file. If you frequently work with generic file types such as TIFF, SYLK, or text, you can set cc:Mail to open each file type with a specific application.

The flip side of this innovative feature is its somewhat confusing implementation. Not only are the icons for attached files displayed in the message form but an icon representing the message text also appears. This design takes some getting used to.

### Powerful Find Command

Another special cc:Mail feature is its powerful Find command, which lets you quickly search for messages by title or contents and allows you to search for users in directories. Once the program has displayed a group of found messages or users, you can further narrow the search with different criteria.

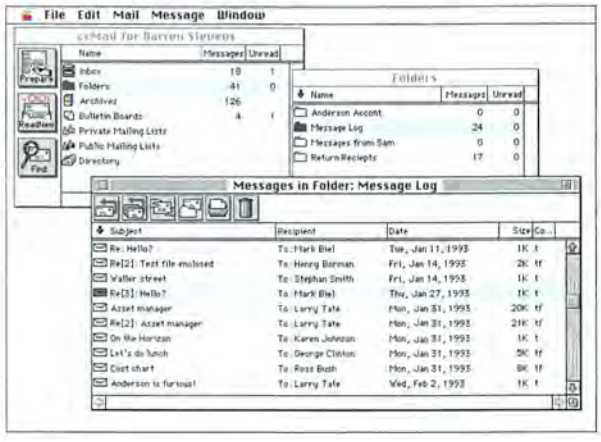
cc:Mail administrators can create public mailing lists that let users send messages to entire departments. Users can create as many as 200 private mailing lists, and each list can hold as many as 200 addresses. cc:Mail supports the standard suite of message-addressing options, including Forward, Carbon Copy, Blind Carbon Copy, and Send to Groups.

Compared with other mail systems, cc:Mail offers the most flexibility for entering addresses: You can drag user names from the directory or the Find window into the address field, but by far the fastest and easiest method is to type part of the user's name in to the address field — cc:Mail fills in the rest.

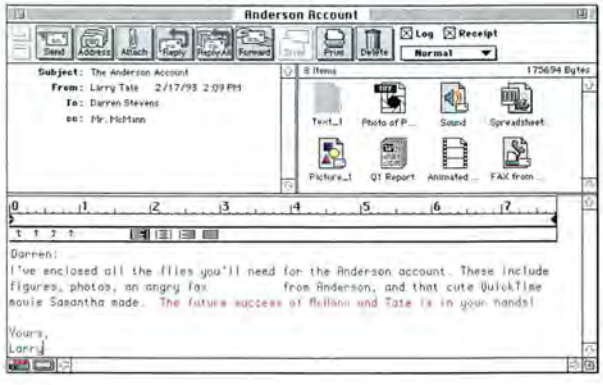
cc:Mail is the most versatile and innovative mail system you can find, but you pay in RAM for its impressive feature set. The client software has a suggested memory partition of 1,200K, although we were able to run it with less than 1 megabyte.

### Making Connections

In addition to its client-software amenities, another cc:Mail strong point is the ease with which it lets Macs exchange messages with other platforms, including PCs running the DOS, Windows, and OS/2 versions of cc:Mail and UNIX workstations running OPEN LOOK.




**cc:Mail's client-software interface is significantly improved in version 2.0. Colorful icons (upper left) give you access to all the basic mail functions. By clicking and dragging, you can easily move files and names between windows.**




**You can view cc:Mail's attached files — including graphic, text, QuickTime, and DOS files — before downloading, by double-clicking on the files' icons.**

Unlike other E-mail programs, cc:Mail doesn't require a gateway between Macs and PCs, but it does require a file server — accessible to all users — to hold the mail-center file, which is called Post Office. The file server, which doesn't have to be mounted on users' desktops during normal operation of cc:Mail, can be a Mac running AppleShare, a PC running Novell's NetWare or Banyan's VINES, or a UNIX or VAX host. Network managers can administer cc:Mail over the network from either a Mac or a PC.

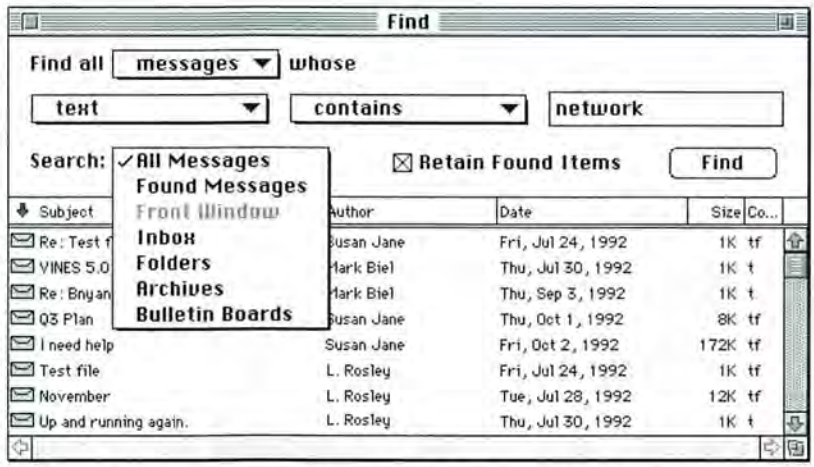
### Post Office

Strictly speaking, cc:Mail's Post Office is not a mail server; it's a database file that Macs and PCs running cc:Mail client software can access. This design not only makes the mail system easy to set up but it also makes Mac-to-PC communications faster than going through a gateway.

However, we found cc:Mail's Mac-to-Mac communications even slower than those of QuickMail, which has never been noted for its speed. That's because cc:Mail relies on the file-server software, not on mail-server software, to locate the Post Office file on the server's hard disk. Mail systems, such as Microsoft Mail and QuickMail, that use mail-server software to locate addresses on the server generally get faster results. Moreover, because much of cc:Mail's intelligence resides in its client software, the mail system's performance is largely dependent on the client's CPU power.

cc:Mail users can exchange messages with users of Lotus Notes, because the PC-based Notes server has a built-in gateway to cc:Mail. Lotus also offers gateways to several other E-mail systems, including MCI Mail, PROFS, SMTP, 3Com Mail, and UNIXMail/UUCP. A cc:Mail-to-QuickMail gateway is also available, from StarNine Technologies.

Besides having an architecture that's suited for multiplatform situations, cc:Mail is optimized in one other way for Mac-and-PC networks: Mac and PC users can easily share files as well as messages. cc:Mail comes with Claris XTND file translators that automatically translate PC files. You double-click on the PC files' icons in the enclosure window, and cc:Mail opens the files by using the appropriate Mac applications. For example, you can set cc:Mail to translate DOS XyWrite files and open them in WriteNow. To beef up the system's multilingual capabilities, you can add XTND-compatible translators such as DataViz's MacLinkPlus translators.




**cc:Mail is the only Mac mail system that offers a powerful Find command. You can search for messages by title and content and search for users and groups within directories.**

If your network has more than one mail server, a mail system that provides automatic directory updates across servers when user lists change is a big plus. cc:Mail's $995 Automatic Directory Exchange package, which requires the $1,295 cc:Mail Router, provides automatic directory updating across both local- and wide-area networks. The package also includes cc:Mail Import/Export, for importing directories from other mail systems into cc:Mail.

### The Cloud in the Silver Lining

cc:Mail's innovative features are impressive, but a few disturbing artifacts from the original version remain. Most annoying is the message window's lack of clear separation between a message and its reply, which means users can type a reply before, after, or even in the middle of the original message — a confusing situation, particularly with a long thread. You can partially solve this problem by setting a preference to add a line between messages and replies.

Fortunately, cc:Mail lets you use different colors for message text and backgrounds, which makes it easy to distinguish between different users' messages in a long thread (each person must use a different color). Given such a high level of customization, it's especially disappointing that you can choose only monospaced fonts for messages, although you can use any font for list-window items.

cc:Mail's feature set is robust, but a few items are missing. cc:Mail does not let you create personal message forms, as you can with QuickMail, nor does it let you unsend messages.

### The Bottom Line

The latest version of cc:Mail elevates the package from minor player to major power in the Mac E-mail arena. We found cc:Mail especially well designed for Mac-and-PC networks.

cc:Mail's strong points include ease of use, automatic translation between Mac and PC file formats, and a powerful Find command. Sluggish performance is somewhat offset by the ability to view enclosed files without downloading them. A few rough edges in the interface aside, cc:Mail is one slick E-mail package.

— John Rizzo

## Get Info

**cc:Mail**

★★★★

**Published by:** Lotus Development Corp., cc:Mail Division, 2141 Landings Drive, Mountain View, CA 94043; 415-961-8800.
**Version:** 2.0.
**List Price:** $495 for 1 Mac and 1 server; $845 for 25 Macs and 1 server (other configurations are also available).

ANIMATION

# Morph 1.0

**Gryphon Software's Kafkaesque tool excels at creating QuickTime-based transformations.**



**With Morph, Gryphon Software's new image-blending tool, you can create unique transformation effects and save them as QuickTime movies. Notice how smoothly the facial features of Scott Bakula, of "Quantum Leap," transform into those of "Out All Night" star Patti LaBelle.**

Gryphon Software just added another noun-verb to our burgeoning techno-babble lexicon. Morph, short for metamorphosis, is the name of the new image-blending tool that was the talk of last summer's Macworld Expo. Morph has a prodigious appetite for memory and processing power. Nevertheless, its unique capabilities make it well worth the investment for digital videophiles who are looking to create truly eye-popping QuickTime effects.

### Creating the In-Betweens

Morph's concept is simple: You select start and end images, and the software creates the images in between, allowing one image to smoothly transform into another. If you caught Michael Jackson's *Black or White* music video, which featured the faces of men and women transforming seamlessly into one another, then you've got the idea.

You can save entire transformations, or morphs, as QuickTime movies or PICS files, or you can link sequences of morphs to create a single movie. You can also save individual frames as PICT images. Source images, in both color and black-and-white, can include photographs, drawings, and text.

People make especially interesting morph subjects. By morphing a toddler with her mother, for example, you can simulate generational similarities or the passage of time. You may even be tempted to morph yourself with your favorite sex symbol, which sounds vaguely illegal but is entirely possible.

The quality of a morph depends on the information you give it with the program's key points. When you position a "transform from" point in a start image, a corresponding "transform to" point appears in the end image. You adjust the placement of points by clicking and dragging. Place as many key points as you want — the more, the better. Keyboard shortcuts let you quickly toggle among tools for placing, adjusting, and magnifying. Unfortunately, you can't select multiple points and move them all at once — a serious omission.

### Practice Makes Perfect

It takes a little practice to position points correctly. In the illustrated example, Scott Bakula's ears are visible whereas Patti LaBelle's ears are hidden. So where to put a point on LaBelle when its counterpart is on Bakula's ear? It's not always intuitive. If you do it wrong, the result appears to be an ugly superimposition rather than a morph. When you get it right, the morph movie can be smooth and eye-catching. Fortunately, the Morph package includes instructive samples.

The smoothest morphs come from source images that are very similar in position and shape. Morphing dissimilar subjects can be tricky, because it's difficult to accurately place key points. Moreover, individual frames can look a bit strange.

Once you've set your key points, you can save the morph as a QuickTime movie. You may find time to read sizable chunks of Kafka's *The Metamorphosis* while waiting for Morph to compile and save your transformation, however. A 5-second, 40-frame movie took nearly 12 minutes on a Mac IIcx with 8 megabytes of memory. Gryphon has wisely included an easy-to-use single-frame preview, so you can test your morph one frame at a time before you save it as a movie.

At $149, Morph may look like an inexpensive do-it-yourself movie-effects tool. However, you should be aware that you'll need a minimum of 8 megabytes of RAM to use the program effectively and that a math coprocessor is a worthwhile investment for speeding up the morphing process. Images must be in PICT format at 72 dpi, and both the start and end images must be exactly the same size. You'll probably also want to clean up source images by eliminating noisy backgrounds and unnecessary elements with a painting program before processing the images with Morph. The program comes with the required QuickTime system extension.

### The Bottom Line

Morph is one more step along the path toward bringing high-end video effects to the Mac. It takes a while to master the process of positioning Morph's key points, but if you've got the time and the necessary hardware and memory, check out this program. It's fun; it can add snap to your presentations; and best of all, it can painlessly transform you into Arnold Schwarzenegger or Marilyn Monroe, if only on-screen.

— Shelley Cryan

**Get Info**

**Morph**

★★★★

**Published by:** Gryphon Software Corp., 3298 Governor Drive, Box 221075, San Diego, CA 92122; 619-454-6836.
**Version:** 1.0.
**List Price:** $149.

WORD PROCESSING

# LetterPerfect 2.1

**A slim, trim version of its sibling, LetterPerfect is a nimble word processor for low-end Macs.**




**LetterPerfect is an inexpensive, pared-down version of WordPerfect that retains some powerful features, such as the ability to find and replace text attributes. The program's ability to display formatted text in the Find dialog box is a nice touch.**

By tossing out a slew of WordPerfect's fanciest features and slashing the price, WordPerfect Corp. has come up with a word processor that's, well, darn near perfect for low-end Macs. Although LetterPerfect isn't optimized for demanding chores, the program's ability to open, edit, and save WordPerfect 2.1 files makes it an attractive choice for those who work in WordPerfect environments on low-end Macs and for PowerBook users who want to work on WordPerfect documents at home or on the road.

### All in the Family

If you're familiar with WordPerfect, you'll feel right at home with LetterPerfect. The program's menus are nearly identical to those of WordPerfect, as are its commands. Among the WordPerfect features you won't find in LetterPerfect are style sheets; page-layout tools; tables; macros; built-in drawing tools; borders and fills; QuickTime support, and support for indexes, tables of contents, and cross-references. In addition, many WordPerfect-command selections are simplified in LetterPerfect, in some cases offering one or two choices to WordPerfect's four or five.

The result is a simple but surprisingly flexible program with a feature set that compares well with those of other low-end word processors. LetterPerfect comes with a 125,000-word spelling checker and a 43,000-entry thesaurus. A ruler similar to WordPerfect's lets you set indents, alignment, and tabs. LetterPerfect's ruler also makes it easy to create multiple columns of different widths — a daunting task in other word processors. Moreover, you can create multicolumn layouts to substitute for tables. The program also provides strikeout, redlining, and other special character formatting as well as a generous supply of tools for headers, footers, footnotes, and endnotes.

LetterPerfect accepts graphic images in TIFF, PICT, GIF, MacPaint, and EPS format. You can treat graphics as characters, or you can anchor them to specific locations on pages.

You have many options for finding and replacing text as well as character attributes with LetterPerfect's Find/Change command. The Find dialog box even displays text formatted in the font and size you've selected.

Like WordPerfect, LetterPerfect makes it easy to use stationery files. When you save a LetterPerfect document as a stationery file inside the program's Stationery folder, the file is instantly available from the File menu. LetterPerfect also provides merge commands for printing form letters and mailing labels.

LetterPerfect translates a variety of word-processing formats, including the DOS versions of WordPerfect, Microsoft Word, and MacWrite. Under System 7, translation is as simple as dragging files onto the LetterPerfect icon to convert and open them.

When you open WordPerfect 2.1 files with LetterPerfect, you can edit the text but you can't view features that LetterPerfect doesn't support, such as paragraph borders. All aspects of the original WordPerfect files are preserved when you save the files in LetterPerfect.

With all its likable attributes, the program does have several limitations. LetterPerfect isn't a good choice if you rely on outlining — it lacks this feature altogether. For PowerBook use, the program's performance and modest memory requirement of 800K are quite acceptable. But LetterPerfect's adherence to WordPerfect's design slightly detracts from its appeal as a PowerBook word processor. Like WordPerfect, LetterPerfect relies heavily on keyboard commands mapped to function keys or numeric keypads, neither of which are built in to the PowerBook. Moreover, some commands, such as LetterPerfect's Reveal Code, are completely inaccessible from a PowerBook keyboard.

If you thought you somehow missed the first version of LetterPerfect, relax: Version 2.1 marks the program's debut. In homage to WordPerfect, and as further evidence of its complementary design, LetterPerfect's version number is set to match that of WordPerfect.

### The Bottom Line

Most WordPerfect features absent from LetterPerfect will never be missed by the program's intended audience. For PowerBook and low-end-Mac users who don't require style sheets or outlining, LetterPerfect is an attractive and affordable choice. And with its ability to open and edit WordPerfect files, LetterPerfect is especially well suited to those looking for an inexpensive but compatible alternative to WordPerfect.

— Eric Taub

**Get Info**

**LetterPerfect**

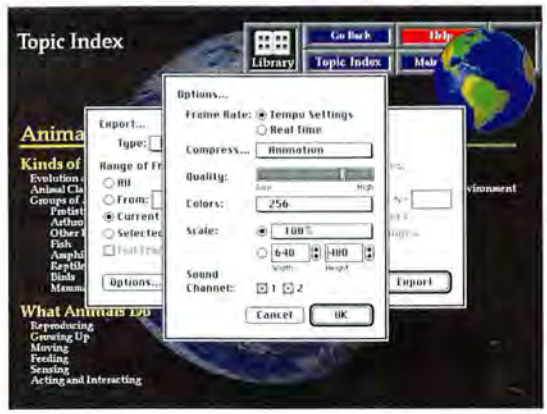
★★★½

**Published by:** WordPerfect Corp., 1555 N. Technology Way, Orem, UT 84057; 801-225-5000.
**Version:** 2.1.
**List Price:** $149.

MULTIMEDIA

# Director 3.1

**The granddaddy of Mac multimedia presentation programs jumps on the QuickTime bandwagon.**




MacroMind Director's newly added QuickTime export facilities include all the standard QuickTime compression options as well as selectable output scaling and the option to include Director sound channels and timing settings.

MacroMind Director users looking to incorporate QuickTime movies into their presentations need wait no longer. The latest upgrade to Macromedia's venerable 2-D-animation and authoring tool features QuickTime support along with several new Lingo commands and a long list of bug fixes.

### Director Links

Director's newly added QuickTime support lets you import QuickTime movies just as you would any other image file and position them on the Director stage. As an alternative to importing movie files, you can link disk-based movies to Director animations and edit them with external editing programs.

You can open a window in Director that displays QuickTime's standard transport controls, enabling you to preview movies before placing them on the Director stage. You can loop imported movies within Director, but unfortunately the program doesn't provide a visual loop-status indicator. You can also move QuickTime movies across the screen as they play and create unique effects with Director's Trails mode, which leaves each played frame in the wake of the movie as it travels across the screen.

Macromedia has updated several Director controls to make them QuickTime-smart. For example, if you place a QuickTime movie in an animation, a new option will let you prompt Director to wait until the movie is finished playing before the program proceeds to the next frame in the sequence.

As with some other QuickTime-compatible programs, imported QuickTime movies play with noticeable visual and audio jerkiness in Director. To get around this problem, you can use HyperCard XCMDs from within Director to play QuickTime movies instead of using Director's facilities. (This technique also enables you to play QuickTime movies with Director 3.0, by the way.) Another workaround to the jerkiness problem is MovieShop, an Apple utility (available free on AppleLink) that eliminates most QuickTime playback-synchronization problems.

Version 3.1 sports several QuickTime-specific enhancements to Lingo, Director's programming language. With Lingo, you can do such things as change the playback speed and direction (forward/reverse) of QuickTime movies and ascertain their duration, check to see if QuickTime is present on playback machines, and more.

Macromedia has further enhanced Lingo in numerous ways unrelated to QuickTime. Most noteworthy is a new Lingo command that checks to see how much RAM is required to play a range of frames. This feature is particularly useful if you're creating animations destined for playback on other Macs.

### Outgoing Animations

In addition to letting you incorporate QuickTime movies *into* animations, Director allows you to export animations, complete with Director's two sound channels, as QuickTime movies. The program provides full support for the standard QuickTime compression options, and you can scale your output as you save it.

Director's QuickTime output facilities don't support pixel dissolves, though — a major drawback. Also, the program doesn't handle custom 8-bit palettes, which may be a problem for Director users who rely on custom palettes.

Director 3.1's list of bug fixes is a long one. Most notable are those affecting anti-aliasing: The program now supports interruptible anti-aliasing and includes anti-aliasing support for the Macintosh Display Card 8•24 GC.

The new package also includes the MacroMind Accelerator, which previously was sold separately for $195. Accelerator executes frame differencing on Director files at full screen size, which dramatically speeds the playback rate. Unfortunately, once you have accelerated a movie, you can't convert it to QuickTime.

Also new is an optional CD-ROM package that includes the full Director application, an extensive set of sample animation files, Lingo code samples, and the valuable Macromedia technical-support database. The database is stored in several formats on the disc: FileMaker Pro, tab-delimited text, and SYLK.

### The Bottom Line

For multimedia professionals, Director maintains its position as the premier animation and authoring tool. QuickTime support aside, version 3.1 is worth the upgrade price for its bug fixes alone. And although Director's newly added QuickTime support has a few rough edges — lack of support for pixel dissolves and an imperfect playback facility — it's still a welcome addition few Director users will want to be without.

— David Biedny

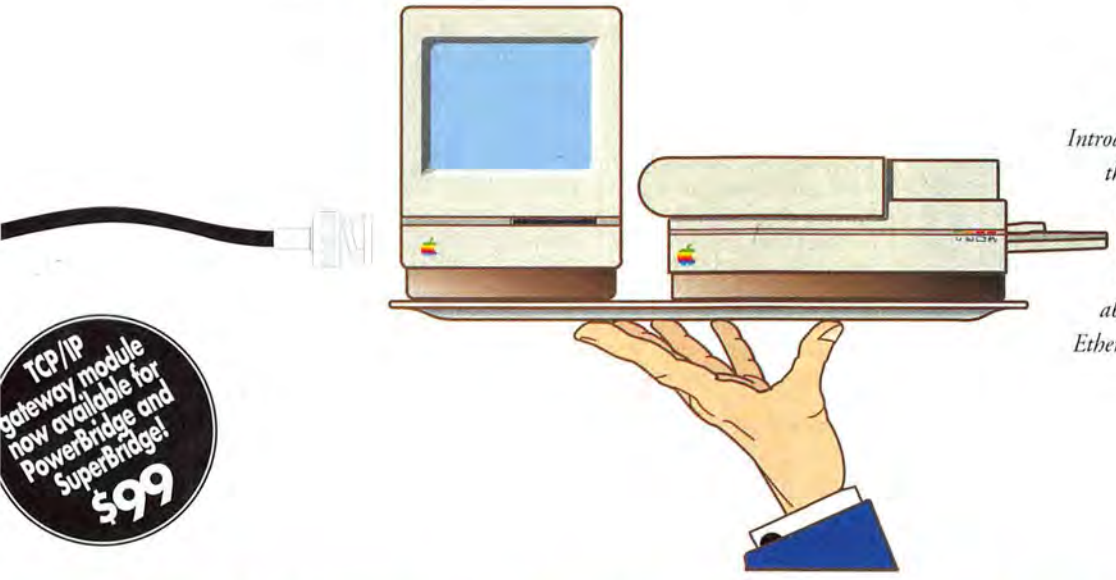
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**MacroMind Director**

★★★★½

**Published by:** Macromedia, 600 Townsend Street, Suite 310, San Francisco, CA 94103; 415-252-2000.
**Version:** 3.1.
**List Price:** $1,195; CD-ROM version, $1,295.

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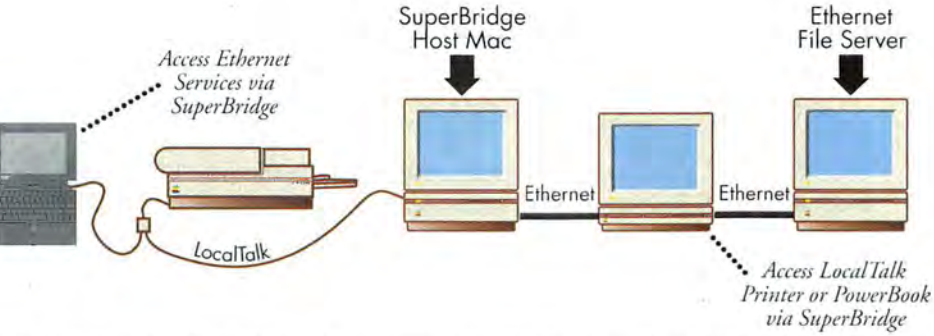
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DRAWING

# MacDraw Pro 1.5

**Sluggish performance continues to plague Claris' veteran drawing program.**

When Claris released the first major upgrade to its veteran drawing program two years ago, users soon discovered they'd paid a hidden cost for MacDraw Pro's nifty new features. Screen redraw was sluggish, as was performance of basic tasks such as entering text and moving objects. With the recent release of MacDraw Pro 1.5, Claris claims to have addressed MacDraw Pro's performance woes. But our tests showed that despite speed improvements for some operations, others can be even slower than they were in the preceding version.

### When Fast Is Slow

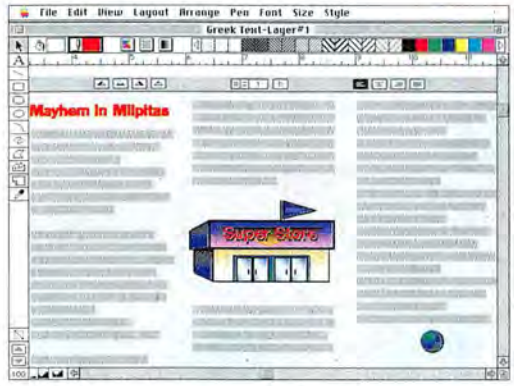
MacDraw Pro 1.0's fancy multicolor gradient fills were a primary cause of the program's performance problems. Unfortunately, Claris' fix for the problem, a new Fast Gradient display option, results in even pokier performance and is far less attractive on-screen. True, version 1.5's off-screen buffer enables you to shave about a second off the time required to rotate multiple gradient-filled objects. In general, however, we found that the buffer markedly increased the time required for screen redraw and scrolling when gradients were involved.

We can report performance improvements in other areas, though. Fast typists need no longer worry about typing text more quickly than MacDraw Pro can enter it. We also noticed a marked speed improvement in text scrolling and rotating. Furthermore, new greeking options for graphics and text can significantly boost screen-redraw performance.

Version 1.5 provides two options — Standard and Precise — for type placement. If you're willing to trade precision for speed, you can select Standard character placement to make the program print faster — it ignores kerning and tracking information. Text quality, however, is noticeably affected. When you're printing gradients, version 1.5 lets you specify exactly how many steps will be used for each blend, so you can avoid creating an image too complicated for your printer's resolution.

Claris has also remedied a glaring omission of the original MacDraw Pro — full System 7 support. Version 1.5 supports Balloon Help, and you can publish, as well as subscribe to, multiple objects in a drawing. The new MacDraw Pro, in fact, gives you more options for publishing than do other programs; you can publish objects on a specific layer or across layers, for example.

Version 1.5 also includes Apple-events support, so you can control MacDraw Pro from other applications. A sample HyperCard stack included in the package demonstrates one way to exploit this capability: You can control a MacDraw Pro slide show remotely on a network from another Mac that's running HyperCard. Another advantage for presentations is the new version's ability to place QuickTime movies as objects within drawings. Ultimately, however, we found that MacDraw Pro's lack of support for transitional effects significantly detracts from its appeal as a presentation tool.




**MacDraw Pro 1.5's new text-greeking option can significantly boost display speed. Screen-redraw performance remains a problem with some operations, however.**

As with most Claris products, MacDraw Pro's chief

strength is its elegantly designed interface. Version 1.5 sports several new enhancements. You can now select all objects within a document that match one or more attributes and then modify all the objects in a single step. This feature comes in handy, because the program doesn't let you set up links between palette items, such as fills and lines, and the objects to which they've been applied (as does rival IntelliDraw, from Aldus), so you can't make quick global changes to object attributes by simply selecting alternative fills and lines from the palette.

Version 1.5 provides several new keyboard shortcuts, among them shortcuts for changing type size and for changing the gradient display mode on the fly.

### The Bottom Line

With its elegant interface; ease of use; and excellent support for layers, gradient fills, and text handling, MacDraw Pro is a solid drawing program. Not even Deneba's blockbuster drawing package, Canvas, can match MacDraw Pro's eye-catching multicolor gradients and powerful paragraph-level text formatting. However, sluggish screen redraws remain a problem, even with the latest upgrade.

Moreover, MacDraw Pro is still missing several key features that rival programs provide. You can't convert text to outlines or attach it to paths, nor can you create multiobject blends between shapes. You also can't edit MacDraw Pro files with PostScript design programs such as Illustrator and FreeHand.

Overall, MacDraw Pro's strengths and weaknesses balance out to earn it an average rating in the drawing-software arena. With rival programs Canvas and IntelliDraw boasting more powerful and innovative features, MacDraw Pro needs to play catch-up before it regains its status as a top contender.

— Eric Taub

## Get Info

**MacDraw Pro**

★★★½

**Published by:** Claris Corp., 5201 Patrick Henry Drive, Santa Clara, CA 95052; 408-727-8227.
**Version:** 1.5.
**List Price:** $399.


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OUTPUT DEVICES

# Canon CJ10

**Canon's one-stop color solution may be pricey, but it does triple duty as copier, scanner, and printer.**

What's bigger than a bread box and the most versatile color-output device you can buy? The Canon CJ10, that's what. By adding an optional interface to this 400-dpi digital color copier, you can connect the device to your Macintosh and use it as a scanner and printer as well. The Canon CJ10 is an ideal entry-level color machine for small workgroups who are looking to produce color output in-house.

### Copier

Setting up the copier is simple. Once you've removed the hefty 43-pound CJ10 (21.25 x 18.75 x 8.5 inches) from its shipping carton, just install the inkjet cartridges and load the paper. The CJ10 uses Canon's color Bubble Jet technology. Four bubblejet cartridges (cyan, magenta, yellow, and black) come with the unit. Each $90 cartridge contains ink and a 128-nozzle print head good for producing an average of 1,000 copies.

The CJ10's paper-input tray holds 90 sheets of special coated paper. The paper is costly ($21 for 200 sheets) and doesn't allow double-sided copies, because you must load the paper with the "whiter" side up. It's somewhat difficult to distinguish one side of the paper from the other, but if you print on the wrong side, you'll know it — the back side doesn't readily absorb ink, so you end up with a streaked, dripping page and excess ink smeared inside the printer. A manual-feed system for transparencies ($100 for 50 sheets), label paper ($4 for 10 sheets), and card stock ($25 for 50 sheets) comes with the unit.

The CJ10 platen accepts originals as large as 8.5 x 11 inches. Thanks to a double-hinged cover, you can place bound material flat on the platen. The copier can magnify or reduce from 50 to 200 percent in 1-percent increments. Four fixed ratios are available, and you can specify separate horizontal and vertical magnification ratios.

The copier is ready for action after only a 10-second warm-up period, so you don't have to leave it on all the time. However, although it requires only 90 seconds to copy an entire letter-sized original at 100 percent, the CJ10 is not for high-volume jobs, because you can't set it to process more than 19 copies at a time. In our tests, the default settings produced copies with noticeably poor color balance, but buttons on the front of the CJ10 let you lighten or darken colors individually (nine settings per color) to



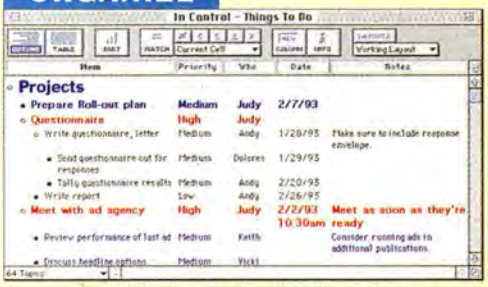
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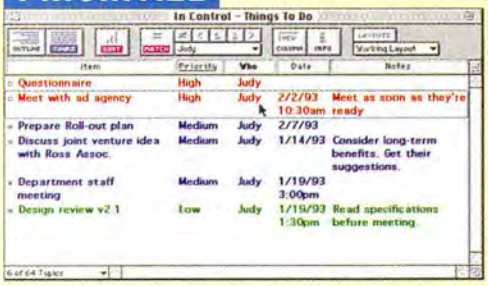
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3608 ❼MacUSA ..... 29. 3356 ❼MacGlobe . 34.
**★CheckMark Software ... 60 day MBG**
5863 ❼MultiLedger 225. 3767 ❼Multi-User 419.
5862 ❼Payroll 4.6..... 169.
**★Chena Software ... 30 day MBG**
1594 ❼Fair Witness 1.2..... 185.
**★Chipsoft ... 30 day MBG**
8059 ❼MacInTax Personal Ed. 1992 Headstart.. 49.
❼MacInTax State Tax Packages..... *ea.* 35.
3916 ❼MacInTax & Quicken Bundle..... 59.
**★Claris ... 30 day MBG**
1129 ❼MacWrite II 89. 1745 ❼MacProj Pro 409.
3903 ❼ClarisWorks 1.0V2 199. 3743 ❼Upgrade 95.
3531 ❼Claris Resolve 169. 3745 ❼Upgrade 95.
3836 ❼FileMaker Pro 2.0 268. 2191 ❼Upgrd. 109.




**★Attain Corporation ... 60 day MBG**
8465 ❼*In Control 1.1*—Get organized fast with this top-rated To-Do-List Manager. Rated 4½ Mice by *MacUser* (8/92). In Control's multi-column outline lets you organize and reorganize your lists instantly ..... **$87.**




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4086 ❼Easy Alarms 2.0 ..... 61.
★**Expert Software ... 30 day MBG**
5234 ❼Expert Writer 1.0 ..... 29.
★**ExperVision ... 30 day MBG**
7486 ❼TypeReader *($100 rebate thru 12/31/92)* 499.
★**Good Software ... 30 day MBG**
2527 ❼REMS Property Manager ..... 399.
★**Helix Technologies ... 30 day MBG**
1077 ❼Helix Express ..... 299.
★**Intuit ... 30 day MBG**
2507 ❼Quicken 3.0 ..... 42.
★**JAM Software ... 30 day MBG**
6089 ❼Smart Alarms Plus 3.1 ..... 45.
1153 ❼Smart Schedules ..... 199.
★**Kaetron Software ... 30 day MBG**
7066 ❼OrgChart Exp. 124. 8941 ❼TopDown 195.
★**Lotus Development ... 30 day MBG**
3606 ❼1-2-3 for Mac.. 289. 3604 Upgrade . 95.
★**MECA ... 60 day MBG**
2796 ❼Managing Your Money ..... $44.
★**Microlytics ... 60 day MBG**
6461 ❼WordFinder Plus 4.02 ..... 39.
7820 ❼Random House Encyclopedia 1.0 ..... 68.
★**Microsoft ... 30 day MBG**
2884 ❼Works 3.0.. 155. 8173 ❼Upgrade.... 79.
3669 ❼Excel 4.0.. 295. 5237 ❼Upgrade.. 95.
4902 ❼Word 5.0... 295. 1503 ❼Upgrade .. 125.
5454 ❼The Microsoft Office 2.5 ..... 475.
★**Niles & Associates ... 30 day MBG**
4602 ❼EndNote 1.5.. 85. 8010 ❼Plus 1.2.. 145.
**Nisus Software**
5683 ❼Nisus 3.06 238. 1612 ❼Compact 3.3 92.
★**Nolo Press ... 30 day MBG**
4228 ❼Personal RecordKeeper 3.0 ..... 30.
2981 ❼WillMaker 4.0 *(not valid in LA.)* ..... 35.
1204 ❼Living Trust 1.0 *(not valid in LA.)* ..... 45.
★**OCCAM Research Corp. ... 60 day MBG**
3697 ❼MUSE 1.01 ..... 469.
★**Palo Alto Software ... 60 day MBG**
6932 ❼Employee Handbook Toolkit 5.2 ..... 65.
6975 ❼Business Plan Toolkit 4.0 ..... 75.
★**Pastel Development ... 30 day MBG**
1785 ❼DayMaker 2.0 *(Dec.)* 79. 1011 *(network)* 92.
★**Portfolio Systems ... 30 day MBG**
7992 ❼DynoPage 1.7 or 6916 ❼Dynodex. *ea.* 49.
★**Power Up ... 30 day MBG**
7696 ❼Calendar Creator ..... 48.
7694 ❼Address Book Plus ..... 62.
1760 ❼PowerRunner Bundle ..... 99.
★**ProVUE ... 60 day MBG**
4582 ❼Panorama II 2.0.6 ..... 239.
★**Reality Technologies ... 30 day MBG**
6929 ❼WealthBuilder 1.1*($25 rebate 'til 1/31/93)* 95.
★**Reference Software ... 30 day MBG**
6268 ❼Grammatik Mac 2.0 ..... 39.
**Round Lake Publishing**
❼LetterWorks, SALES or LEGAL .... *ea.* 45.
1570 ❼PERSONNEL ReadyWorks ..... 69.
★**Shana Corporation ... 30 day MBG**
7692 ❼Informed Designer 159. 8810 In. Mgr. 99.
★**SoftSync, Inc. ... 30 day MBG**
7129 ❼Accountant, Inc. 335. 3828 MultiUser 569.
**Spyglass, Inc.**
2027 ❼Transform 2.1 399. 2033 ❼Format 159.
★**Symantec ... 30 day MBG**
2237 ❼GreatWorks 2.0 129. 2278 ❼Upgrd. 89.
3422 ❼More 3.1 ..... 265.
★**Synergy ... 30 day MBG**
6617 ❼KaleidaGraph 2.1.3 ..... 149.
**SYSTAT**
1230 ❼FASTAT for Mac 1.0 ..... 399.
1231 ❼SYSTAT for Mac 5.2.1 ..... 699.
★**Technology Works ... 30 day MBG**
7736 ❼Spiral 1.0 ..... 79.
★**Teleware ... 30 day MBG**
7616 ❼M.Y.O.B. 3.0 ..... 138.
★**TIMESLIPS ... 30 day MBG**
1701 ❼LapTrack for the Mac ..... 52.
2986 ❼Timeslips III 2.1 ..... 194.
★**T/Maker ... 30 day MBG**
3636 ❼ClickArt Holidays ..... 28.
1858 ❼FaxMania *(birthdays to bulletins)* ..... 25.
7709 ❼WriteNow Workshop Compet. Upgrd . 99.
7664 ❼WriteNow Workshop Bundle ..... 139.
★**Vertical Solutions ... 60 day MBG**
5886 ❼FastLabel ..... 44.
3235 ❼MacLabelPak ..... 85.
★**WordPerfect ... 60 day MBG**
3800 ❼WordPerfect 2.1.2 279. 4711 Upgrd. 75.




★**Power Up ... 30 day MBG**
1760 ❼*PowerRunner Bundle*—Get organized, at your desk and on the go! PowerRunner combines Power Up's *Calendar Creator* and *Address Book Plus* software with the *Day Runner Classic Edition* organizer ..... **$99.**

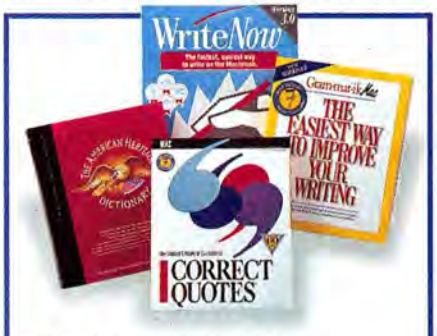
★**Wordstar ... 30 day MBG**
6984 ❼Correct Grammar 3.01 ..... 55.
3554 ❼American Heritage Dictionary 1.0 ..... 55.
★**Working Software ... 60 day MBG**
5896 ❼Last Resort 38. 3792 ❼Spellswell 2.2 44.

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### PUBLISHING, PRESENTATIONS

★**Abracadata, Ltd. ... 30 day MBG**
9990 ❼Design Your Own Home - Architecture, 9992 Interiors or 9994 Landscape... *ea.* 48.
**Adobe Systems**
❼Adobe Type Sets for Business .... *ea.* 95.
❼Adobe Type Library *(Vol. 1-308)* ..... call
6957 ❼Adobe Type Reunion 1.0.3 ..... 41.
5750 ❼Adobe Type Manager *(ATM)* 2.0.3 ..... 59.
6053 ❼Plus Pack 2.0 118. 6098 ❼TypeAlign 61.
4145 ❼Adobe Premiere 429. 3199 Upgrad. 149.
8171 ❼Adobe Illustrator 3.2 *(with ATM)* ..... 368.
5001 ❼Streamline 119. 6644 ❼Photoshop 548.




★**Beagle Brothers ... 30 day MBG**
3119 ❼*BeagleWorks*—Integrated word, spreadsheet, database, paint, communications & draw modules all in one package. Features include In-Context Editing, irregular text wrap, autosum tool, etc. Special limited offer only **$69.**




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7664 ❼*WriteNow Workshop Bundle*—A bundle of packages to improve your writing. Includes **WriteNow 3.0,** the fastest & easiest Mac word processor; **Grammatik**, **Correct Quotes**, and **American Heritage Dictionary** *Free!* ... **$139.**

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★**Aldus ... 30 day MBG**
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2461 ❼Aldus Gallery Effects 1.01 ..... 128.
3506 ❼SuperPaint 99. 7541 ❼IntelliDraw 194.
4751 ❼Persuasion or 3507 ❼Super 3D *ea.* 325.
1330 ❼FreeHand 394. 7088 ❼PageMaker 494.

**Altsys**
1983 ❼EPS Exchange 2.0 ..... 89.
1195 ❼Fontographer 3.5 ..... 258.

**Apple Computer**
3008 ❼Apple Font Pack ..... 69.

★**Ares Software ... 30 day MBG**
8878 ❼FontMonger 1.5 *(Dec. '92)*..... 93.

★**Baseline Publishing ... 30 day MBG**
8055 ❼Screenshot 1.2 ..... 34.

**Broderbund Software**
7293 ❼Kid Pix Companion ..... 23.
3572 ❼Kid Pix 1.2 ..... 34.
1427 ❼Print Shop ..... 35.
6281 ❼TypeStyler 2.1 *(with ATM)*..... 126.

★**Claris ... 30 day MBG**
2518 ❼MacDraw Pro 275. 7505 ❼Upgrade 95.
8007 ❼Claris CAD 2.0 599. 6943 ❼Upgrade 79.

**Custom Applications**
8037 ❼Freedom of Press Light 3.03 *(17 fonts)*. 84.

★**DeltaPoint ... 60 day MBG**
3558 ❼DeltaGraph Pro 2.0 *(with calculator)*.. 199.

★**Deneba Software ... 30 day MBG**
3227 ❼Canvas 3.0.4 ..... 259.




★**After Hours Software ... 30 day MBG**

7411 ❼*TouchBASE & DateBook Bundle*—Together, form a powerful personal information manager. DateBook combines calendar, alarms, scheduling, & To-Do lists. TouchBASE keeps all contacts at your fingertips ..... **$95.**

★**Expert Software ... 30 day MBG**
4870 ❼Expert Color Paint, 1737 Landscape, 8619 Home, or 1731 Office Design *ea.* $29.

★**Foundation Publishing ... 60 day MBG**
9438 ❼Comic Strip Factory Bundle..... 71.

**Fractal Design**
1068 ❼Sketcher 1.0 94. 5425 ❼Painter 1.2 235.

**Gryphon**
4202 ❼Morph 1.0 ..... 95.

★**Letraset ... 30 day MBG**
4709 ❼LetraStudio 139. 6300 ❼FontStudio 359.

**Light Source**
3733 ❼Ofoto 1.1.1 ..... 275.

★**Linguist's Software ... 60 day MBG**
2569 ❼Cyrillic II 99. 2641 ❼Laser Hebrew.. 89.

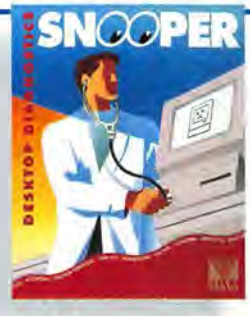
**Macromedia**
7651 ❼Action! Mac 349. 7441❼SwivelPro. 479.
3450 ❼SwivelMan 596. 7653 ❼MacroModel 999.

**Manhattan Graphics**
4990 ❼Ready,Set,Go! 5.14 ..... 219.

★**MicroMaps ... 30 day MBG**
7556 ❼MapArt *(PICT)* or 7555 *(EPS)*..... *ea.* 89.

★**Microsoft ... 30 day MBG**
2878 ❼PowerPoint 3.0 *(Nov. '92)*..... 295.

**Postcraft International**
2210 ❼Effects Specialist 1.04 ..... 89.




★**MAXA Corporation ... 30 day MBG**

8692 ❼*Snooper 2.0 Hardware & Software Kit—(Dec. '92)* Sad Mac? Diagnose from your Desktop with Snooper. Check out your hardware with over 60 tests. Rate your Mac performance. A must for your Utilities folder **$149.**

**Quark**
7612 ❼QuarkXPress 3.2 *(Dec. '92)*..... 549.

★**Specular International ... 30 day MBG**
4962 ❼Infini-D 2.0 699. 3543 Replicas #1 135.

**Terrace Software**
9970 ❼Mum's The Word Plus *(gardening)*... 107.

★**Timeworks ... 30 day MBG**
7115 ❼Publish It! *Easy* 3.0..... 109.
7409 ❼Color●It! 2.0..... *special* 129.

★**T/Maker ... 30 day MBG**
❼ClickArt *(bitmapped)* 38. or *(EPS)*.... 82.

★**Virtus Corporation ... 30 day MBG**
4488 ❼WalkThrough 1.1 ..... 309.

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### UTILITIES, HYPERCARD, SECURITY

★**Abbott Systems ... 30 day MBG**
2515 ❼Calc+ 1.0 39. 5236 ❼CanOpener 2.0 59.

★**Aladdin Systems ... 30 day MBG**
7410 ❼StuffIt SpaceSaver 1.0..... 34.
6740 ❼StuffIt Deluxe 3.0..... 65.

★**Aldus ... 30 day MBG**
5100 ❼SuperCard 1.6 ..... 195.

★**ALSoft ... 30 day MBG**
9808 ❼MasterJuggler 25 9807 ❼DiskExpress II 48.
5204 ❼ALSoft Power Utilities 1.0.2 ..... 62.




★**Teknosys ... 30 day MBG**

5203 ❼*Help!*—Configuration problem solver improves Mac's efficiency & prevents crashes. Artificial intelligence detects conflicts, incompatibilities, improperly installed files, damaged & duplicated files, etc..... **$88.**

★**Alysis Software ... 30 day MBG**
2687 ❼SuperDisk! 49. 1608 ❼More Disk Space 42.

★**Apple Computer ... 30 day MBG**
1206 ❼At Ease 1.0 ..... 49.
1074 ❼System 7.1 *(with free video)*..... 79.
3413 ❼System 7.1 Group Upgrade Kit..... 349.
7072 ❼QuickTime Starter Kit 1.5 ..... 149.

★**ASD Software ... 30 day MBG**
7085 ❼FileGuard 2.7 *(1 user)* ..... 138.

★**Baseline Publishing ... 30 day MBG**
7783 ❼INIT Manager 33. 3114❼DiagnoSYS 39.

★**Berkeley Systems ... 30 day MBG**
2198 ❼More After Dark *(M.A.D.)*..... 23.
5737 ❼After Dark 2.0V 28. 2196 ❼Bundle... 39.
3392 ❼Star Trek: The Screen Saver..... 34.

★**Casa Blanca Works ... 30 day MBG**
1593 ❼Drive 7 2.3 ..... 49.

★**CE Software ... 60 day MBG**
1727 ❼CalendarMaker 3.0.1 ..... 31.
8024 ❼QuicKeys$^2$ 2.1.2 ..... 89.

★**Central Point ... 30 day MBG**
5041 ❼Mac Tools Deluxe..... 95.

★**Claris ... 30 day MBG**
8734 ❼HyperCard Development Kit 2.1..... 139.

★**Connectix ... 30 day MBG**
8441 ❼CPU *(Connectix PowerBook Utilities)*... 49.

**Coral Research**
7310 ❼TimeLog.... 62. 7309 *(10 Pack)*.... 399.

★**Dantz Development ... 30 day MBG**
3393 ❼DiskFit Pro 1.0 ..... 72.
5255 ❼Retrospect 147. 7945 ❼Remote 1.3 264.
7946 ❼Remote *(10 Pak)* 147. 3112 ❼*(50 Pak)* 649.

★**Fifth Generation ... 30 day MBG**
4287 ❼PYRO! 4.01 27. 3955 ❼Suitcase 2.1 53.
8286 ❼SuperLaserSpool 3.0..... 99.
5178 ❼FastBack Plus or 5725 ❼DiskLock... 125.
7404 ❼DiskDoubler 52. 4838 AutoDoubler.. 58.

★**FWB, Inc. ... 30 day MBG**
7929 ❼Hard Disk Utilities Personal Edition.... 49.
2999 ❼Hard Disk ToolKit 1.1.1..... 125.

**ICOM Simulations**
6296 ❼Intermission.. 29. 3731 ❼OnCue II.. 55.

★**Inline Design ... 30 day MBG**
1744 ❼Icon 7..... 31. 9843 ❼InSync 1.0.... 79.
7068 ❼INITPicker 3.0..... 49.
2913 ❼Redux 1.63.... 49. 1740 Deluxe..... 92.

**Insignia Solutions**
7552 ❼Rapid Trak ..... 56.

★**Kent Marsh Ltd. ... 30 day MBG**
9513 ❼FolderBolt 1.02 ..... 71.

★**Kiwi Software ... 60 day MBG**
6267 ❼KiwiENVELOPES! 3.1.6 ..... 32.

★**Magic Software ... 30 day MBG**
7267 ❼AutoSave II 26. 7270 ❼Backmatic.. 50.

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2707 ❼*Puzzle Master*—Solve 250 New York Times crossword puzzles on your Mac. **$26.**
5910 ❼*Crossword Creator*—Create your own puzzles from a word list..... **39.**

**★MAXA Corporation ... 30 day MBG**
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8694 ❼Snooper *(software only)* ..... 119.
**★Microcom ... 30 day MBG**
4803 ❼Virex/Mac.. 66. 8561 ❼911 Utilities .. 99.
**★MicroMat Computer Sys. ... 30 day MBG**
3732 ❼MacEKG II 2.0.5 ..... 89.
**★Microspot ... 30 day MBG**
8706 ❼MacPalette II..... 45.
8782 ❼MacPlot Professional..... 249.
**★Nine to Five Software ... 30 day MBG**
2020 ❼9 to 5 Office 19. 9767 ❼Reports 2.5 125.
**★Now Software ... 30 day MBG**
1793 ❼Now Up-To-Date... 65. 2366 *(10)*. 395.
6925 ❼Now Utilities 4.0.... 95. 8471 *(10)*. 775.
**Palomar Software**
8210 ❼PLOTTERgeist 2.1 ..... 249.
**Peripheral Land, Inc. (PLI)**
7326 Mac-to-DOS 3.0 ..... 99.
**Pluma, Inc.**
8704 ❼Cause or 8713 ❼Net Effect ..... *ea.* 185.




**Graphic Simulations**
4756 ❼*Hellcats Over the Pacific 1.0.3*—1992 *Macworld* Game Hall of Fame winner for Best Simulation Game, Airborne Division. Fast & fluid graphics, 256 colors & high-quality sound, transport you into the cockpit of an F6F Hellcat **$38.**

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5176 ❼Symantec AntiVirus for Mac *(SAM)*.. $64.
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3421 ❼THINK Pascal 165. 2688 ❼THINK C 199.
9957 ❼THINK Reference 1.0 ..... 68.
**Teknosys**
5203 ❼Help! ..... 88.
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6667 ❼Prograph 2.5..... 299.
**★Thought I Could ... 30 day MBG**
4843 ❼Wallpaper 1.0.2 ..... 37.
**UserLand Software**
4753 ❼Frontier 2.0 ..... 189.
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9616 ❼Guaranteed Undelete w/TrashMaster 45.

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**★Abracadata, Ltd. ... 30 day MBG**
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**Activision**
1039 ❼Shanghai II ..... 29.
1134 ❼Lost Treasures of Infocom Vol. I..... 40.
2470 ❼Lost Treasures of Infocom Vol. II..... 29.
**★AMTEX Corporation ... 30 day MBG**
2517 ❼TRISTAN *(pinball)* ..... 33.
**★Baseline Publishing ... 30 day MBG**
7785 ❼Talking Moose 4.0.2 ..... 22.
**Broderbund Software**
6516 ❼The Playroom 2.0 *(CP) (color)*..... 29.
❼Carmen Sandiego Series *(CP)*..... *ea.* 29.
8285 ❼Where/World Carmen Sandiego Deluxe 47.
3559 ❼SimAnt or 5871❼SimCity Supreme. *ea.* 35.
8266 ❼SimEarth 1.1..... 40.
1910 ❼SimLife.... 41. 3307 ❼A-Train .... 39.
**Buena Vista Software**
1711 ❼Heaven and Earth..... 29.
**★Carina ... 30 day MBG**
7761 ❼Voyager II, the Dynamic Sky Simulator 99.
**★Centron Software ... 30 day MBG**
2707 ❼Puzzle Master..... 26.
5910 ❼Crossword Creator ..... 39.
8525 ❼Casino Master... 39. 8524 *(Color)*.... 45.
**Colorado Spectrum**
2554 Mouse Yoke *(aircraft yoke adapter)* ..... 29.
**★Cyan ... 30 day MBG**
6320 ❼Manhole 1.6..... 19.
**★Davidson & Associates ... 30 day MBG**
3922 ❼Talking Spell It Plus..... 29.
2574 ❼New MathBlaster Plus ..... 34.
8278 ❼Alge-Blaster Plus..... 34.
**Delta Tao Software**
2536 ❼Spaceward Ho! or 2439 ❼Strategic Conq. 36.
**EARTHQUEST**
8050 ❼EARTHQUEST or 3118 ❼Ecology 1.0 34.
**★Edmark Corporation ... 30 day MBG**
7155 ❼Kid Desk ..... 24.
7318 ❼Millie's Math House ..... 29.
**Electronic Arts**
1907 ❼PGA Golf.... 39. 2963 ❼StarFlight II .. 39.
2805 ❼PGA Golf Tournament..... 18.
**★Expert Software ... 30 day MBG**
6219 ❼Expert Astronomer 1.0..... 29.
**Graphic Simulations**
4756 ❼Hellcats Over the Pacific 1.0.3 ..... 38.
**★Great Wave ... 30 day MBG**
6693 ❼KidsMath 2.0 or 2276 Kid's Time.. *ea.* 25.
4334 ❼NumberMaze.. 25. 8527 ❼*(Color)*.. 35.
1513 ❼ReadingMaze *(Color)* ..... 35.
3471 ❼DaisyQuest *(Dec. '92)* ..... 35.




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❼Pronunciation Tutor
*(Span., Fren.) ea.* 32. *(Germ., Chin.) ea.* 38.
**★Inline Design ... 30 day MBG**
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1747 ❼Swamp Gas Europe 7652 ❼Cogito *ea.*. 37.
7646 ❼Tinies *(Nov.)* 7650 S.C.OUT *(Dec.) ea.* 37.
8809 ❼Tesserae 31. 3414 ❼Mutant Beach. 37.
**Innerprise**
1662 ❼CyberBlast..... 25.
**Interplay Productions**
1894 ❼BattleChess *(3D animation)*..... 29.
1893 ❼CheckMate *(infinite play levels)*..... 31.
**★Learning Company ... 30 day MBG**
2670 ❼Reader Rabbit 3.0 *(CP) (ages 4-7)*..... 34.
2988 ❼Super Solvers: SpellBound!..... 34.
3281 ❼The Writing Center 1.0 ..... 51.
**★Leister Productions ... 30 day MBG**
7126 ❼Reunion 3.0 ..... 115.




**★Leister Productions ... 30 day MBG**
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2196 ❼*After Dark & M.A.D. Bundle*..... **39.**

**★MECC ... 30 day MBG**

3963 ❼Oregon Trail 1.1..... 28.

3960 ❼Number or 3959 Word Munchers... *ea.* 18.

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2868 ❼Flight Simulator 4.0 *(CP)*..... 42.

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7312 ❼Educ. Series V. 1-Animated Relativity 105.

**★Nordic Software ... 30 day MBG**

8257 ❼Preschool Pack - Color 2.0..... 34.

7470 ❼Jungle Quest 30. 7537 ❼Kolor Klips 37.

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**★Personal Training Sys. ... 60 day MBG**

*Training for System 7, Excel, Lotus 1-2-3, Persuasion, FileMaker Pro, PageMaker, Illustrator, FreeHand, Word, HyperCard, QuarkXPress, ClarisWorks & Mac ...ea.* 49.

**Pluma, Inc.**

8695 ❼Capitalist Pig..... 34.

**★Que Software ... 30 day MBG**

9743 ❼Typing Tutor V..... 29.

**Sierra On-Line**

3552 ❼Leisure Suit Larry V or 7396 Red Baron 39.

**★SoftStream ... 30 day MBG**

4489 ❼Galactic Frontiers *(1 to 4 players)*..... 38.

3472 ❼Family Cards *(Solitaire, Rummy, War)* 49.

**Software Toolworks**

4619 ❼Mavis Beacon Typing 1.3 *(CP)*..... 29.

**★Spectrum Holobyte ... 30 day MBG**

3464 ❼Tetris.... 22. 3017 ❼Wordtris 1.0 .... 27.

4835 ❼Super Tetris *(10 levels of difficulty)*.... 28.

3459 ❼Falcon 2.2.2 or 8181 ❼Vette 1.0 ... *ea.* 33.

**★Strategic Studies ... 30 day MBG**

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**StudyWare**

1395 ❼StudyWare for Calculus..... 23.

❼ACT, GMAT, GRE or SAT Prep ... *ea.* 29.

8098 ❼LSAT Prep..... 35.

**★Toyogo ... 30 day MBG**

7624 ❼NEMESIS Go Master 5.0..... 38.

7623 ❼NEMESIS Go Master Deluxe 5.0 ..... 99.

**Velocity**

2934 ❼Spectre... 34. 5280 ❼LAN 3-Pak... 57.

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### MONITORS, MUSIC, ANIMATION

**Articulate Systems**

7013 Voice Navigator SW w/Headset Mike.. 325.

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**Coda Music Systems**

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5604 ❼Finale 2.6.1..... 549.

**★DiVA Corporation ... 30 day MBG**

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**Envisio**

4016 ❼Quick 16 *(Nov. '92)*..... 449.

**Macromedia**

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7651 ❼Action! 2.0..... 349.

4598 ❼MacRecorder Sound System PRO... 239.

5087 ❼MacroMind Director 3.1..... 799.

2246 ❼MacroMind Three-D 2.0.2..... 999.

**NEC**

4252 MultiSync 3FGx..... 659.

**Passport Designs**

8250 ❼Encore *(with free Trax)*..... 379.

**Radius**

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5201 The Miracle *(piano teacher)*..... 349.

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9972 ❼Star Trek: The Logical Collection Vol. 1 30.

9988 ❼Star Trek: The Final Frontier Vol. 2 ..... 30.

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4164 VideoSpigot *(for NuBus)*..... 379.

7676 VideoSpigot Pro. 1099. 3691 Pro si 1099.

7679 Spigot & Sound *(NuBus)*..... 489.

7678 Spigot & Sound Pro *(NuBus)*..... 1189.

7677 17" SuperMatch Multimode ..... 1249.

1805 20" SuperMatch Color Display ..... 1599.

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3730 ❼Just Grandma and Me *(CD-ROM)*..... 34.

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8057 Porta Drive CD-ROM..... 579.

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1343 ❼Manhole *(CD-ROM)*..... 23.

2717 ❼Cosmic Osmo 1.1 *(CD-ROM)*..... 37.

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**★Interplay Productions**

7111 ❼Battlechess CD-ROM..... 45.

**★METATEC/Discovery Sys. ... 60 day MBG**

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3683 ❼Backpac 1, 3679 ❼ 2, or 2176 ❼ 3 *ea.* 45.

4007 ❼World Almanac & Book of Facts 1992 50.

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**NEC**

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6582 ❼CDR-74 CD-ROM Drive ..... 629.

4146 ❼CD Express ..... 429.

4132 ❼MultiMedia Gallery..... 865.

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3915 ❼Grolier Encyclopedia *(CD-ROM)*..... 249.



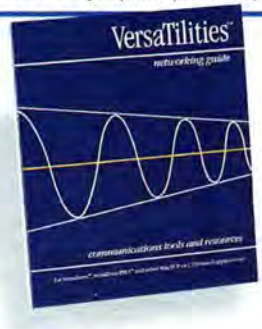

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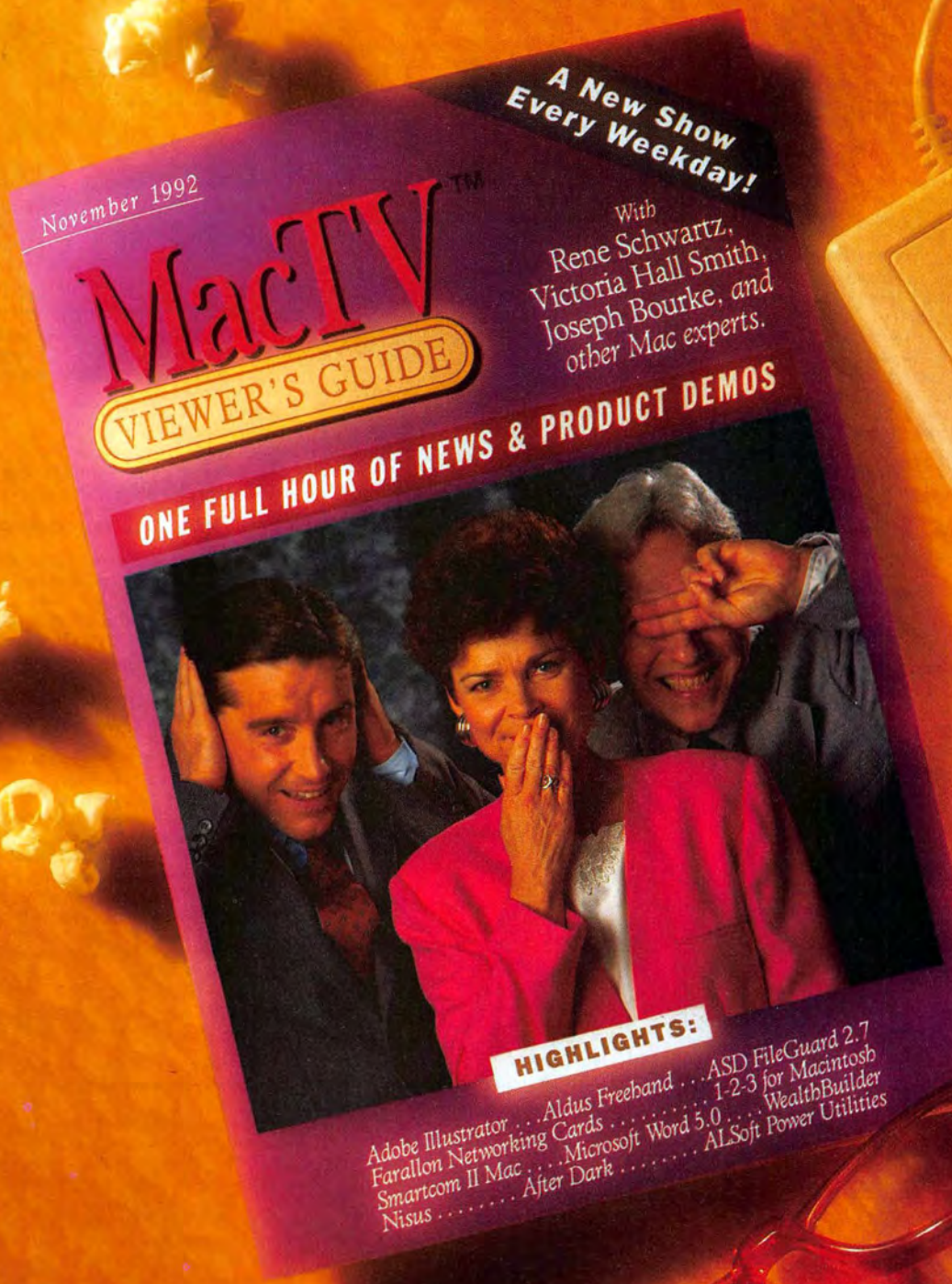



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3401 ❼FastCache IIsi 299, 3389 w/FPU... 369.
❼PowerCache for SE/30, II, IIx, IIcx, IIci, IIsi, LC 40 MHz ..... 819. 50 MHz..... 1179.

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7570 Hammer 80is..... 479.
7579 Hammer Int. 120is 599. 2334 240is 979.
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2467 90 MB Gold Std. Rem. Cart. *(Qty. 3)*... 439.
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2865 Floptical Cart. *(21 MB)* 29. 2899 *(10 pak)* 259.
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4863 3½" HD Disks *(20)* with storage case.... 26.
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1895 QD2120..... 21. 3984 QD2120Q..... 27.

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5528 44 MB Cartridge *(5)*.. 310. 9728 *(10)* 615.
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5530 88 MB Cartridge *(5)*... 480. 3600 *(10)* 950.

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7050 Avery 5660 *(1" x 2 ⅝"-Clear Adrs.-Laser)* 32.

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9961 PhoneNET Card PC ..... 209.
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2175 ❼TelePort/Silver 359. 2179 Gold .... 439.
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5101 ❼HayesConnect 3.0 *(modem sharing)*.. 75.
2300 ❼Smartcom II Mac 84. 3226 Upgrade. 44.
5971 OPTIMA 24 145. 5970 OPTIMA 96 389.
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7557 ❼Access PC... 60. 3229 ❼SoftAT ... 299.
9726 ❼Entry Level SoftPC 2.5 ..... 125.
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**MASS Microsystems**
2280 MASSfm 24/96N Network Fax ..... 349.
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Newsbreak: On October 20, 1992, the U.S. Commerce Department levied preliminary penalty duties against South Korean producers of dynamic random access memory computer chips (DRAMs)—as high as 87.4%. As of press time, memory prices have yet to stabilize. Due to the complexity of this case, a final ruling is not expected until March, 1993. As always, MacConnection will continue to work to offer its customers the best deals on SIMMs as possible. All of our SIMMs come with a full 2-year warranty, plus a free installation manual and video. We also carry VideoRAM for the LC and Quadra, and 2 MB, 4 MB, and 6 MB PowerBook modules.... **call**

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6264 ❼TOPS Network 3.1 187. 2419 *(3-Pak)* 249.
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6974 ❼Mac Pro + Kybrd. 139. 1070 TrakPro 219.
**Kraft Systems**
7519 ❼KM30 Trackball..... 42.
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7112 ❼FotoMan with Digital Darkroom..... 639.
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2807 ❼MicroTRAC ADB *(for SE & II family)* .. 57.
6621 ❼MacTRAC ADB 2.0 *(SE & II family)*.... 75.
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achieve a better balance.

Nonetheless, dark copies suffer from slight banding caused by the copier's printing system (according to the manual's explanation). Also, where large dark areas occur, they saturate the paper, causing it to warp slightly. The special Photo mode is supposed to optimize the copy process for photographs by using an alternative dither pattern, but we couldn't perceive much difference between output produced in Photo mode and output produced in standard mode.

### Intelligent Processing Unit

To use the CJ10 as a color scanner and printer, you must purchase the optional $2,700 Intelligent Processing Unit (IPU). The IPU — a big, mostly empty metal box that fits underneath the CJ10 — requires a Mac equipped with Color QuickDraw, 4 megabytes of RAM, System 6.0.5 or later, and 5 megabytes of free disk space. The box contains a power supply and a logic board, effectively turning the CJ10 into a SCSI device, so you must configure the termination and SCSI ID, using DIP switches — a cumbersome process.

And the extras you'll need don't stop there. In addition to $2,700 for the IPU, you have to shell out $500 for the IPU Kit for Mac, which includes a special edition of Adobe Photoshop (some of the program's features, such as color separations, are disabled), a high-density CJ10 Mac Utilities disk, and a 50-to-25-pin SCSI cable.

### Scanning

With the IPU attached, the CJ10 can operate as a fixed flatbed 400-dpi scanner with a maximum scanning area of 8.5 x 11 inches. Photoshop's Plug-In scanning module adds the CJ10 as an option in its Acquire submenu.

Photoshop aficionados will feel right at home using the CJ10 as a scanner. The Acquire dialog box lets you specify scan resolutions from 72 to 400 dpi and adjust the color depth from 8-bit gray scale to 24-bit color, for a total of 16.8 million colors. Unfortunately, there's no easy way to do quick black-and-white scans — you must first capture an image as gray-scale and then convert it to a bit map with Photoshop. The time required for a scan depends on the size of the original as well as the resolution and color depth specified. Overall, because the CJ10 scans an entire image in a single pass, we found its performance to be quite acceptable.

At 400 dpi, the CJ10 produces sharp, excellent-quality scans of even the most-detailed originals, although you may need to tweak the color balance to adjust to your particular system.

### Printing

Printing with the CJ10 isn't nearly as easy as copying and scanning. Our first test page caused a paper jam. Once we'd cleared the jam (a relatively simple process), the printer didn't automatically resume printing, so we had to initiate the test again.

Unlike the switch-hitting Kodak EktaPlus 7016 printer/copier, the CJ10 is a QuickDraw, not a PostScript, device. As a result, it will be unacceptable to most professional art departments. For the best text reproduction with the CJ10, we recommend Adobe Type Manager or TrueType.

Printing large color images ties up your Macintosh for a long time. The company includes an application for background printing, but this application degrades system performance so seriously that it becomes almost impossible to get any meaningful work done. One other option is to connect the CJ10 to a print server, spool print jobs, and share the printer on a network. This choice would be more attractive if Canon provided a LocalTalk option that didn't require a dedicated Macintosh.

Our tests refute Canon's claim that "for most purposes, the default settings of the Color Control dialog box will produce natural-looking full color prints." We frequently found it necessary to tweak colors, using the RGB color-balance settings in the Page Setup dialog box. The documentation provides a cursory explanation of gamma settings but lacks printed color examples showing the effects of different settings. Once you've adjusted the gamma settings, though, the printed results are sharp, clear, and vibrant — quite satisfactory for in-house presentations and color comps.

### The Bottom Line

With a total list price of more than $10,000, the complete Canon CJ10 system may not be the least expensive solution for color output, but it certainly is the most convenient. You gain a digital color copier, a scanner, and a printer, all in one tidy package. However, when



**Whether you're copying or printing, the CJ10's color output is sharp, clear, and vibrant. The print sample shown here was produced with a photo scanned in at 400 dpi.**

you're spending about 46 cents per page, you'll probably want to limit the CJ10 to color jobs only, so you'll still want a traditional photocopier and laser printer for black-and-white jobs.

Nonetheless, the CJ10 represents an impressive package for first-time color users. All the basic copying, scanning, and printing functions are easy to access, and the results are satisfactory for low-volume, in-house requirements. For those who've been thinking about taking the plunge into color output, the Canon CJ10 makes an excellent springboard.

— Owen W. Linzmayer

## Get Info

### Canon CJ10

★★★½

**Manufactured by:** Canon USA, 1 Canon Plaza, Lake Success, NY 11042; 516-488-6700.

**List Price:** CJ10, $6,995; IPU, $2,700; IPU Kit for Mac, $500.


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| Paragraph style sheets | **Yes** | Yes |
| Character style sheets | **Yes** | No |
| Check spelling | ***8.1 sec*** | 2 *min* 55.8 sec |
| Copy & paste large area | ***5.6 sec*** | 22.2 sec |
| Undo paragraph formatting | ***1.6 sec*** | 27.9 sec |
| Count words in document | ***16.2 sec*** | 1 *min* 31.8 sec |
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GRAPHICS & DESIGN

# CA-Cricket Graph III 1.0

**Ease of use and affordability mark Computer Associates' refashioned version of Cricket Graph.**

Computer Associates' new business charting software doesn't win the standing ovation that went to powerhouse DeltaGraph Professional, but CA-Cricket Graph III does earn a solid round of applause for its ease of use and affordable price. Once the dominant Mac charting program, Cricket Graph was purchased by Computer Associates several years ago. The long-awaited upgrade is a totally rewritten program that bears little resemblance to its predecessor.

### Two Windows

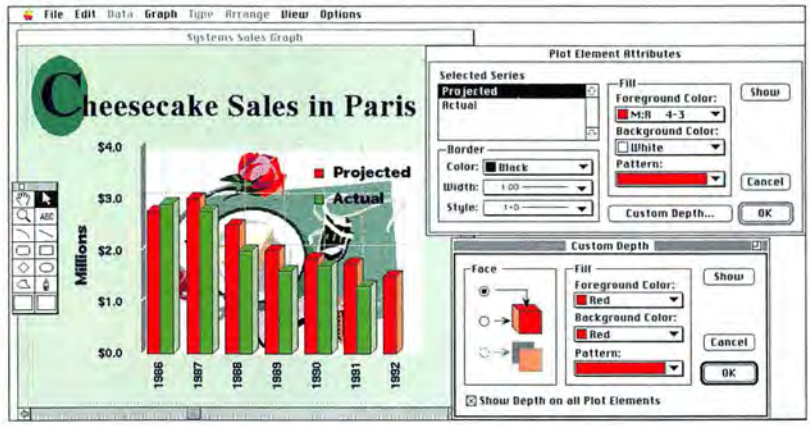
To construct charts with CA-Cricket Graph III, you work in two main environments — a spreadsheetlike data window and a document window that displays charts, pictures, text, and drawn objects. You can have multiple data and document windows open simultaneously. Each document window can consist of multiple pages, so one chart can span several pages.

You can temporarily place objects that are destined for charts on a nonprinting pasteboard that surrounds the drawing area. Chart layouts are WYSIWYG, and alignment and layering controls let you combine drawing and charting elements in virtually any fashion. A palette provides a zoom tool, a tool for moving pages within the document window, and tools for creating and modifying text and objects.

In addition to entering your chart data manually, you can import data in SYLK, DeltaGraph, or delimited-text file format. The program can filter text files to eliminate extraneous control characters, leading, and trailing spaces, which makes it easy to import data from scientific instruments and on-line sources. Unfortunately, Cricket Graph doesn't support System 7's publish-and-subscribe, so you can't link spreadsheet data to Cricket Graph documents for automatic updating. You can, however, hot-link Cricket Graph charts to the program's internal data sheets — an essential feature for any serious charting program.

Once you've entered or imported your data into Cricket Graph's 1,000-column-by-32,000-row spreadsheet window, you can sort and recode it, combine it with formulas, and format it in almost any way imaginable. Formulas can contain column and cell references, mathematical functions (such as sine, standard deviation, and factorial), and logical operators. A random-number generator is also provided.

You can generate charts from your data in one of two ways. Novice chart




**CA-Cricket Graph III is a capable and easy-to-use business charting package. Although it lacks true 3-D-chart support, you can create 3-D effects by adding depth to plot elements.**

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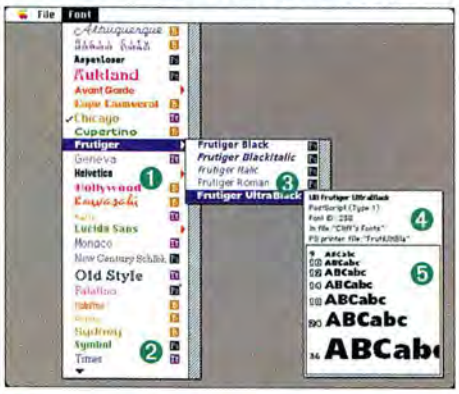
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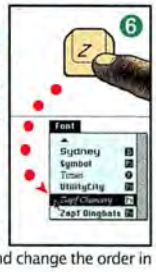
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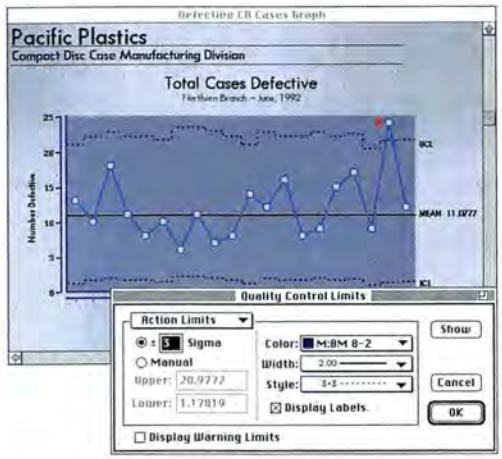
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**CA-Cricket Graph III doesn't provide all the charting bells and whistles required by sophisticated users, but it does offer several scientific charting features, such as the ability to generate complex quality-control graphs.**

makers can select a chart type from the menu and specify the columns of data they want the program to plot, and Cricket Graph displays a helpful dialog box showing how the data will be graphed along the axes. Experienced chart makers can bypass the dialog box and proceed directly to selecting data columns and choosing a chart type.

Customizing charts after you've created them is easy. You can apply fill patterns and colors to any object; add text; and manipulate axes, legends, plot symbols, and grid lines. You can group sets of objects to resize and move them around in the document window as a set, or you can manipulate elements individually. Bézier drawing tools let you embellish your charts with freehand shapes, basic ovals, rectangles, and stars. One glaring omission, however, is a tool for creating arrows.

Cricket Graph's text-entry box functions as a mini word processor complete with ruler; indent markers; justification icons; and a full set of font, size, and style options, including kerning.

You can control the spacing width between your chart's bars and columns, change the color of any chart element, and modify borders and fills (35 patterns are supplied). Line styles and plot symbols are fully customizable as well.

One of Cricket Graph's strongest features is its ability to save chart formats for application to future charts. You can opt to apply a format either before or after a chart is created, or you can selectively apply formats to specific elements such as titles, axes, legends, labels, and scaling.

The options for customizing charts are indeed impressive, but we found Cricket Graph's color support disappointing. The package has several basic palettes, including a set of grays for gray-scale output, and you can create your own customized palettes. However, you can work only with a single palette of 64 colors per document. By contrast, a DeltaGraph Pro palette holds as many as 90 colors. Although Cricket Graph lets you import PICT, MacPaint, and EPS images, colors are mapped to the closest available colors on the active 64-color palette, resulting in some rather strange-looking effects.

Cricket Graph also gives up points to DeltaGraph Pro when it comes to chart types. Compared with DeltaGraph Pro's 40 chart types, Cricket Graph supplies only 10 — scatter, line, bar, column, stacked-bar, stacked-line, area, pie, polar, and quality-control.

Although true 3-D charts are not supported in Cricket Graph as they are in DeltaGraph Pro, you can create 3-D effects by adding depth and drop shadows to chart elements and drawn objects.

Cricket Graph is by no means a full-fledged scientific graphing program, but it provides solid support for quality-control graphs (specialized graphs for studying continuous processes) as well as good curve-fitting options for scatter, line, and quality-control graphs. Combine these features with its text-file-filtering options, data-manipulation tools, and extensive numeric-formatting features, and you have a program that meets many of the needs of engineers and lab technicians.

Cricket Graph is QuickDraw-based and can print to any Mac-compatible printer in gray-scale or color. However, because it lacks PostScript support, the program doesn't provide gradient fills

— a popular feature for presentation-quality charts — and its output quality is not on a par with that of DeltaGraph Pro, which does provide PostScript support. Direct support for 35mm film recorders is also missing.

If you need to present your charts on-screen, you're better off with DeltaGraph Pro, which includes a slide-show presentation module that Cricket Graph lacks.

On the other hand, Cricket Graph is a good choice for low-end-Mac owners. It requires only 2 megabytes of RAM on a color Mac and even runs on 1-megabyte Macs that lack color support. The program is 32-bit clean and provides on-line help. Its manual is thorough and precise, although the short introductory guide that accompanies the manual will suffice for most users.

### The Bottom Line

With its ease of use and flexibility, CA-Cricket Graph III is an attractive alternative to the built-in charting functions of Microsoft Excel. However, chart jockeys who do financial and statistical analysis and who demand every bell and whistle from a charting program won't be satisfied with Cricket Graph. Compared with powerful rival DeltaGraph Pro, Cricket Graph has fewer chart types, no true 3-D support, no publish-and-subscribe support, no built-in links to Excel, and no presentation module.

Still, the program's $195 price tag makes it $100 less expensive than DeltaGraph Pro. That advantage, teamed with the program's ability to run on low-end Macintoshes equipped with 2 megabytes of RAM and less, makes Cricket Graph a good choice for students, teachers, and business users who don't require the sophisticated capabilities of DeltaGraph Pro.

— Becky Waring

## Get Info

**CA-Cricket Graph III**
★★★½
**Published by:** Computer Associates International, Inc., One Computer Associates Plaza, Islandia, NY 11788; 516-342-5224.
**Version:** 1.0.
**List Price:** $195.




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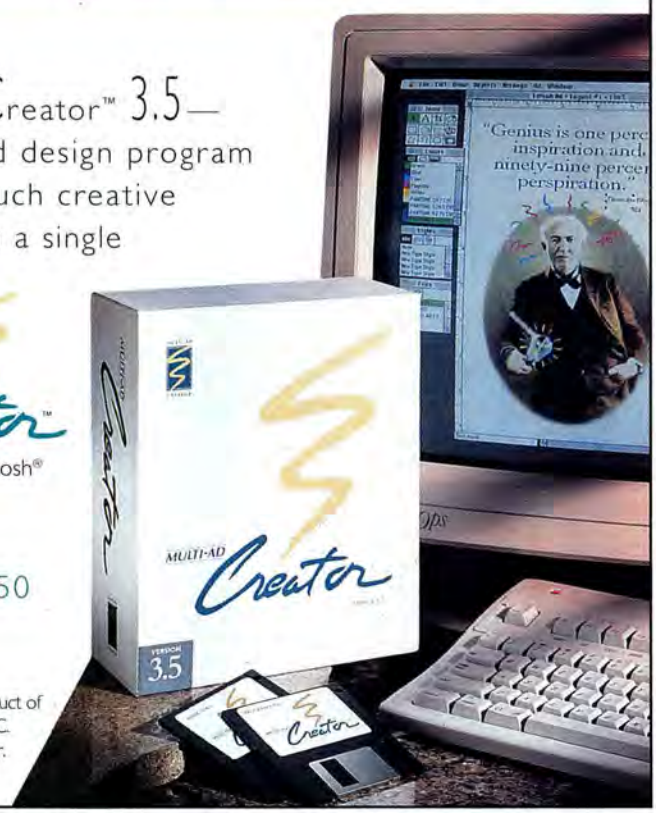
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PRESENTATIONS

# Special Delivery 1.0

## Lack of a Player weakens the delivery of Interactive Media's presentation tool.

If you crossbred HyperCard with Aldus Persuasion, you'd likely get software that resembled Special Delivery, a new kind of presentation package from Interactive Media. Special Delivery combines the slide metaphor of Persuasion with the flexibility of HyperCard. Unlike Persuasion, Special Delivery slides are destined for on-screen delivery only — you can't send output to service bureaus and get slides in return. But what you can do with Special Delivery slides that you can't do with Persuasion's is make them interactive.

### Racking Up Pointers

With its focus on interactive presentations, Special Delivery appears to be in the same software category as Magic and Cinemation. Unlike those two programs, however, Special Delivery is designed primarily for collecting and presenting graphics, QuickTime movies, and sounds that have already been created. It lacks animation tools and a time line, providing only a text tool and a few rudimentary drawing tools for creating graphics.

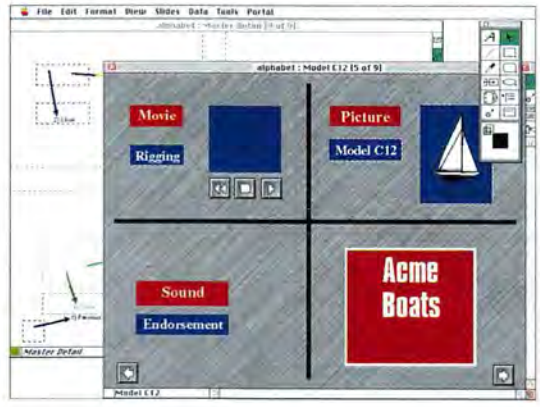
Special Delivery creates pointers to the source material used with its slides. To help organize source files, a convenient Table of Contents feature lists all the source files used in a presentation. A separate utility, the $99 Media Cataloger, quickly searches for and retrieves files.

In this unique role, Special Delivery resembles a page-layout program. Its developers probably reasoned that because you don't use a page-layout program to write a report, you shouldn't have to use a presentation program to create artwork. This is a radical departure from other interactive presentation programs built around painting, animation, and movie-editing tools.

Special Delivery proves that less can be more, though. Its tighter scope and familiar slide format make creating interactive presentations a breeze. In many ways, Special Delivery is as easy to use as Persuasion.

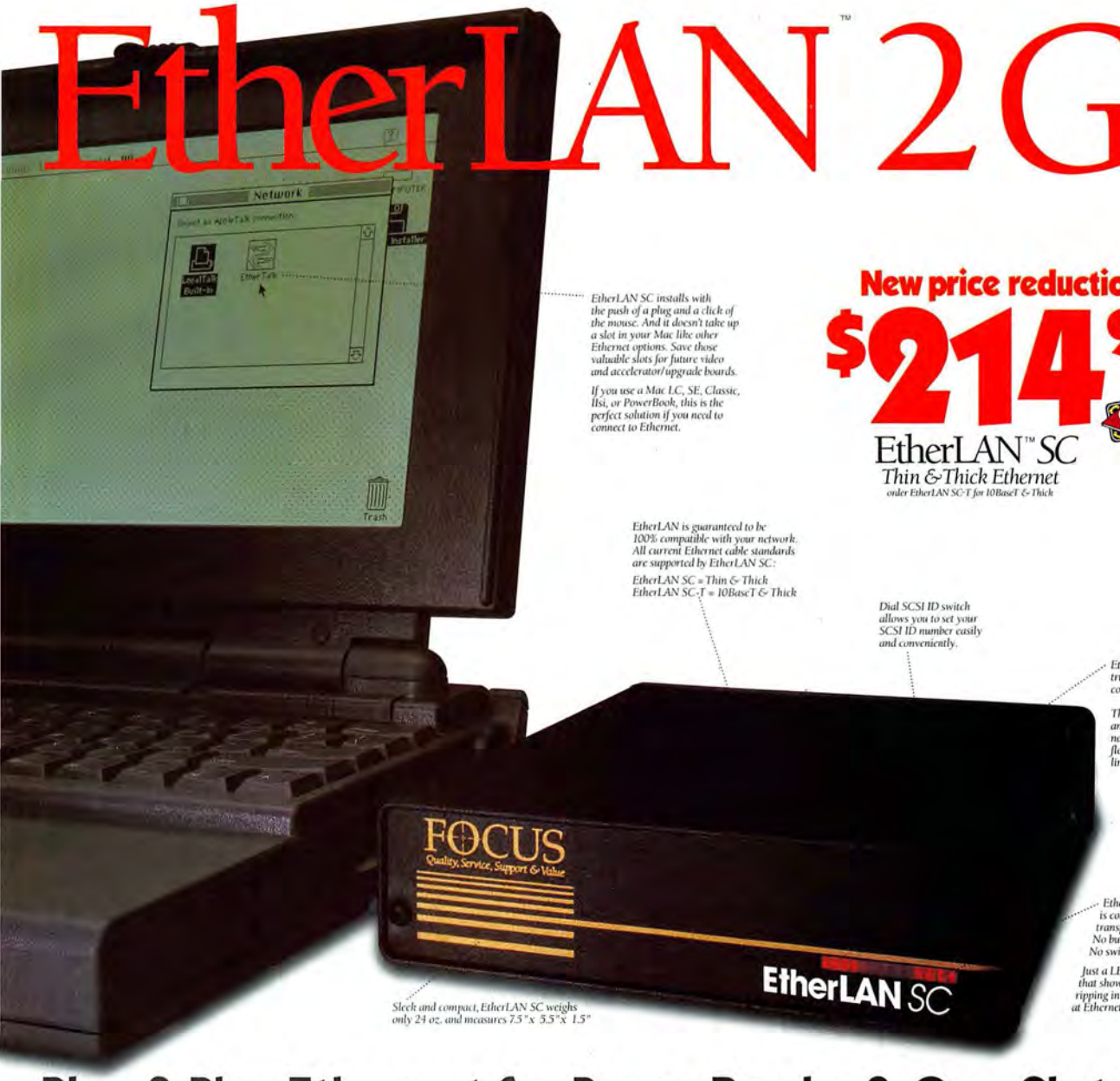
Interactive features are key to navigating through the numerous slide sequences you can create with Special Delivery. That's because the program isn't confined to a linear presentation structure that requires you to move from slide 1 to 2 to 3. Instead, you first set up a main sequence of slides and then create as many secondary sequences — hyperlinks, in effect — as you wish. The secondary sequences offer a flexible way to expand on the ideas presented in your main slides.

If you're familiar with Persuasion, you'll be right at home with Special Delivery. The program lets you work in one of four views: In Layout view, you select colors, enter and format text, and place graphics, movies, and sound; in Button view, you set up interactive controls; Note view lets you create speaker




**Special Delivery lets you assemble slides for multimedia presentations, but you must use existing artwork — the program doesn't provide animation or video-editing tools. You can make slides interactive simply by drawing lines between presentation elements.**

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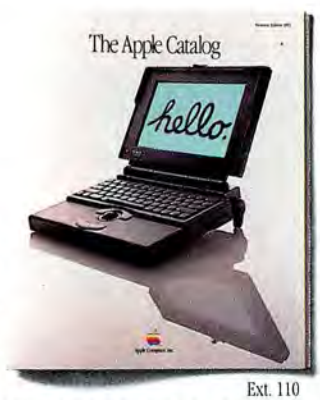
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# REVIEWS

notes and handout information; and in Run view, you deliver your presentation. Unlike with Persuasion, there's no Outline view and you can't import text files to automatically create slides. This makes Special Delivery less than ideal for text-heavy presentations but a good choice if you're using a variety of source-file types.

The basic building blocks of Special Delivery presentations are Portals, which are similar to the frames in page-layout programs. You create Portals to hold the artwork and the interactive controls that make up your presentation. You can draw, color, frame, move, and resize Portals in Layout view.

When you're ready to specify how you want your presentation's interactive controls to work, you move to Button view. This is where things get interesting. You are presented with a kind of skeleton of your current slide that displays all the Portals you have created. These Portals appear transparent, delineated by colored dashed lines on a white background.

Imagine you've drawn four Portals and you want a QuickTime movie to play in one large Portal, with the Rewind, Stop, and Play buttons occupying the three smaller Portals. To link the movie to the controls, you simply draw a line from each of the smaller Portals to the large one and select each line and specify its function, using the pull-down Button menu. When you configure the line linking the Play button to the movie, you also select the movie in a standard Place File dialog box. To see your slide in full color, complete with three functional VCR-like control buttons, you select the Run View command. Interactive buttons that play sound and bring up pictures and text are just as easy to configure. Special Delivery also lets you add standard transition effects such as wipes and fades.

You can add a wide assortment of navigation controls to your Special Delivery presentations. Pop-up Go To buttons let you jump to any slide in the presentation. Special Delivery lets you give each slide a name for easy recognition. What's more, a Portal can act as a hot link to another slide. You can also configure buttons to control presentation-wide settings, including volume adjustment, soundtrack control, and overall pause and resume. A dialog box makes it easy to select snippets of movies or sound and control their duration.

Special Delivery is a brand-new product. As such, it suffers from a few rough edges. Several features are inconvenient or nonintuitive. For example, formatting text can be a real chore, because the program doesn't provide a text-format dialog box — you must select font, color, size, style, and alignment separately. Some interface elements don't gray out when they're inactive, and Balloon Help is paltry.

However, Special Delivery's most egregious flaw is its lack of a run-time version for distributing presentations, a feature that Persuasion, Cinemation, and Magic all provide. This omission just doesn't make sense.

Special Delivery requires System 7, QuickTime, and 4 megabytes of RAM.

### The Bottom Line

Special Delivery's lack of an adequate distribution capability seriously detracts from its usefulness as a presentation tool. Nevertheless, the program represents a unique entry in the presentation-software arena. Because it lets you build on-screen presentations with elements created in other programs, it doesn't force you to learn another set of tools. Moreover, many companies maintain a substantial collection of presentation materials created by their own graphics departments that users can tap in to for their Special Delivery presentations.

If you're familiar with Persuasion's slide-making concept, you'll immediately adapt to Special Delivery's environment, although what sets it apart from Persuasion is its ability to create interactive presentations. Special Delivery's method for creating links that join button controls to slides and presentation elements is unmatched in its simplicity. Even though it borrows from other applications, Interactive Media's Special Delivery represents a unique presentation-software offering.

— Shelley Cryan

## Get Info

**Special Delivery**

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QUICK CLICKS



## Numeric Keypad ★★★½

## NoteBook KeyPad ★★★★

## PowerPad ★★★★½

PowerBook users, take note: Three companies have come out with keypads that give you back the function keys and numeric keypad you gave up when you bought your notebook Mac. All of them are lightweight, small, and easy to install, but the similarities end there.

We found Plusware's Numeric Keypad to be the least ergonomic of the three. It's flatter than the others, making it difficult to curve your fingers comfortably, and its keys feel sluggish and tend to stick. However, it does provide some useful extra keys for the Home, End, Page Up, Page Down, and Forward Delete functions.

Kensington's NoteBook KeyPad has a smoother feel and is the handiest of the three for entering consecutive functions. Its keys are larger, matching the size of standard adding-machine keys, but the arrow keys are awkwardly positioned at the top of the pad and require you to suspend your wrist uncomfortably above the other keys in order to use them. The NoteBook KeyPad is the only one of these keypads that lets you enter consecutive functions without holding down or pressing an additional key — an important capability for users who connect to mainframes to access programs that rely on function keys. However, Kensington's is also the only keypad that monopolizes the PowerBook's ADB port; the Plusware keypad has a port on the back of its cable connector, and Sophisticated Circuits put two ports on the back of the PowerPad, leaving one free for another device.

Sophisticated Circuit's PowerPad was our overall favorite by virtue of its elegant feel, its financial-calculator-key-layout option, and its unique bundled software. The PowerPad's keys are lightest to the touch; its stand elevates and tilts it slightly; and it has the fewest keys, minimizing the area your fingers have to cover. It also comes with extra keys, so you (or Sophisticated Circuits, free of charge) can switch the places and size of the + and Enter keys to convert to the key layout of a financial calculator. The PowerPad doesn't shine in the area of accessibility of functions, however. The Mode key, which switches among the number-key, function-key, and arrow-key modes, isn't easy to press, and the light that indicates the current mode — by being on, off, or blinking — is nonintuitive.

Bundled software is a major advantage of the PowerPad. The 10Key Tape DA alone may make it worth your while to choose this keypad. 10Key Tape displays an on-screen running total, much as the tape of a ten-key adding machine does. This data can be edited, copied into other applications, and printed. You also get a ModifierKeys extension, which lets you use the PowerBook's modifier keys in conjunction with PowerPad keys for keyboard shortcuts. Plusware bundles QuicKeys2 Lite with the Numeric Keypad, and Kensington hasn't (as of press time) bundled any software with the NoteBook KeyPad but plans to include the same type of software Sophisticated Circuits does (by the time you read this review).

Plusware Numeric Keypad, Plusware, Inc., 80 Citizen Court, Unit 2, Markham, ON L6G 1A7 Canada; 800-268-7587 or 416-477-0015. $129.

NoteBook KeyPad, Kensington Microware Ltd., 2855 Campus Drive, San Mateo, CA 94403; 800-535-4242 or 415-572-2700. $149.95.

PowerPad, Sophisticated Circuits, Inc., 19017 120th Avenue N.E., Suite 106, Bothell, WA 98011; 800-827-4669 or 206-485-7979. $129; with QuicKeys, $189.

— Nancy Peterson



## FastTrack Schedule ★★★½

FastTrack Schedule is an easy-to-use tool for making Gantt charts, those graphical representations of activities and milestones that project managers spend hours juggling.

To create Gantt charts with FastTrack Schedule, you simply enter activity names and draw activity bars or milestones on your chart, using tools from a floating toolbox (you can also provide date and duration information and let FastTrack Schedule do the drawing for you). An outlining feature automatically indents activities that are part of a project phase and enables you to collapse the outline to display only certain levels. You can also create dependencies among activities, using two types of links, and you can lock activities to prevent them from being changed. As the project progresses and you add actual start and completion dates, FastTrack Schedule automatically updates the dates for any dependent activities.

FastTrack Schedule offers a great deal of formatting flexibility. You can vary column widths and headings; create new bar and milestone styles; choose from six time scales; shade or hide nonwork days or hours; and change the format of text, dates, times, and numbers. You can also insert pictures or text blocks anywhere in a chart. The Page Preview view permits formatting as well — you can add text, graphics, page numbers, dates, and times. Plus you can print your schedule as a standard chart or as pieces of a wall chart that can be assembled after printing. For other formatting or manipulation, FastTrack Schedule lets you import or export tab- or comma-delimited files.

FastTrack Schedule's interface and features have a few shortcomings. The program lacks on-line help (although the manual is thorough and well written), complete support of the Undo command (several commands can't be undone), and support for Balloon Help and publish-and-subscribe (although otherwise FastTrack Schedule works fine under System 7). Also, the dialog boxes and buttons are not entirely Mac-looking, and increasing the font size of an activity name can cause part of the text to be cut off (because the row height doesn't increase correspondingly). The program lacks a feature some users may sorely miss: It can't automatically change an activity's duration based on actual dates, locked deadline milestones, and activity links.

On the whole, FastTrack Schedule is a fine project-management tool. If you're looking for a quick and easy way to create Gantt charts, this program might be just the one for you.

AEC Software, 22611 Markey Court, Building 113, Sterling, VA 20166; 800-346-9413 or 703-450-1980. Version 2.0. $279.

— Maria L. Langer

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## Headline Harry and the Great Paper Race

★★★½

If you'd like history to have the same immediacy as today's headlines, check out Davidson & Associates' Headline Harry and the Great Paper Race. Featuring excellent graphics, sound, and QuickTime footage of news events, Headline Harry lets you play reporter on events from the '50s through the '80s as you cover 12 stories. Using interviews, tapes, a radio, and a reference book (none of these are interactive — they burp up information when you click on them), you try to find the story of a historical event. Your competition is an unscrupulous rival paper named the *Diabolical Daily*, and your distractions include plenty of red-herring stories from other time periods.

The way Headline Harry mixes up time periods is fun for adults, but kids tend to be so confused about time periods already that mixing time periods defeats some of the purpose of a history game. Our 12-year-old tester liked the game but found even the easiest stories frustrating at times; red herrings from the same year as the main story could have provided a challenge in a less confusing manner.

The program has some minor annoyances, including a glitch that sometimes occurs when you visit cities in a sequence that diverges from your itinerary (the game freezes, requiring a reboot); another problem is that the program makes you use the headline from the manual to get an event accepted. Headline Harry also takes up a lot of space on your hard drive (9.5 megabytes) and needs 4 megabytes of RAM to run; we wish we could have forgone the QuickTime movies to trim the space requirement.

Aside from these quibbles, Headline Harry provides a worthwhile way for kids in grades 7 through 12 and adults to brush up on their recent history (and U.S. geography, as you travel around the country to gather information). The stories are interesting, and the abundance of material about important female, black, and Latino figures makes Headline Harry a positive addition to school computer labs.

Davidson & Associates, Inc., P.O. Box 2961, Torrance, CA 90509; 800-545-7677 or 310-793-0600. Version 1.0. $59.95.

— Carol Dorf

## Shiva LanRover/L

★★★★

Using ARA (AppleTalk Remote Access), bundled free with every PowerBook sold in the U.S., is a handy way to stay in touch with the network back at the office — if there's a Mac running ARA at the other end of the phone line.

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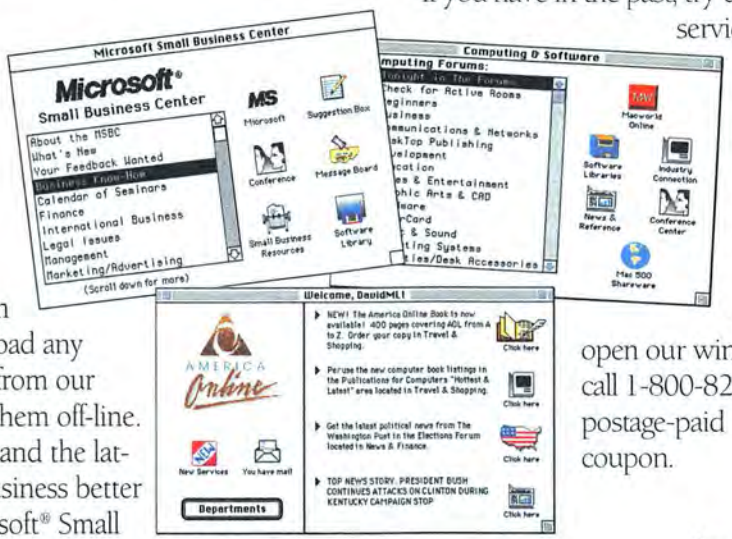
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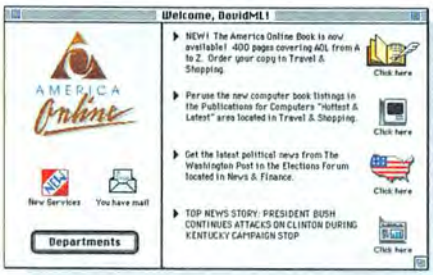
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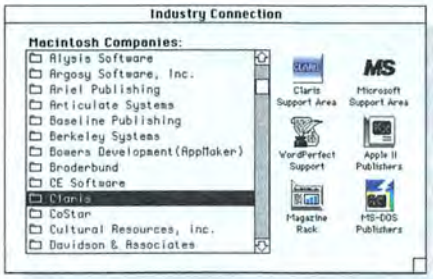
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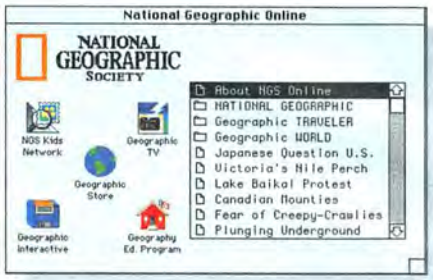
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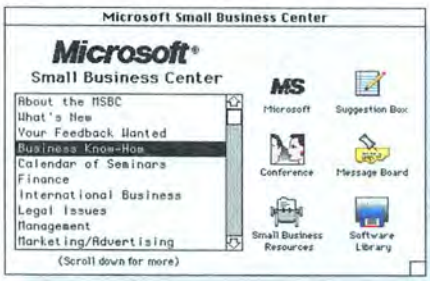

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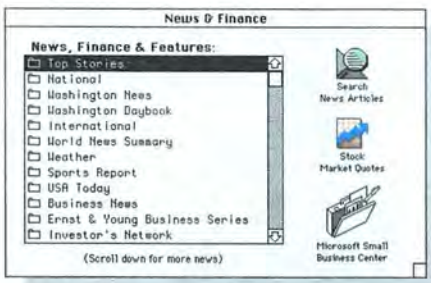

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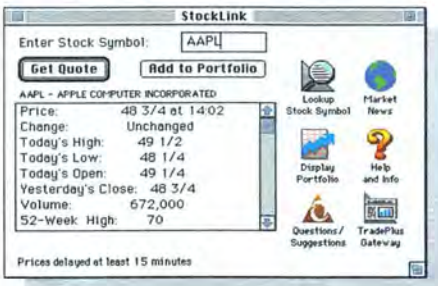

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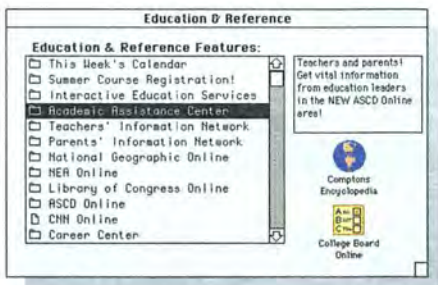

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But some PowerBook users don't have an office Mac readily available to call in to, or they don't want to be vulnerable to losing the remote connection if the office Mac crashes. Now these users can turn to Shiva's LanRover/L, a modem-sized gray box that serves the same remote-connection purpose as a dedicated Mac — for much less money and with greater reliability.

Setting up a LanRover/L is straightforward. You plug in the power supply, connect the single serial port to a modem with the included cable (or a cable you purchase, because the included cable doesn't support hardware handshaking, which is necessary for reliable 9,600-bps or higher-speed modem communication), and connect the single LocalTalk port to your LocalTalk network (both ports use standard DIN-8 connectors, like those on the back of your Mac). Then you turn the unit on. You perform the remaining setup tasks on a Mac on the network, using software that Shiva includes with the LanRover/L.

Because the LanRover/L is meant to replace a Mac running ARA, it performs the same functions as ARA, with no additional features such as user-specific network-access control. As with ARA, the LanRover/L setup involves defining users, their passwords, and optional callback phone numbers. The LanRover/L also keeps a log of successful and failed connection attempts. In addition, it uses the same CCL (Connection Control Language) files that ARA uses to configure and operate modems: You select the CCL files from within the Shiva management application and transmit them to the LanRover/L over the network. One potential pitfall with this approach is that subtle CCL errors may cause you to think that the LanRover/L is malfunctioning when in fact the CCL file is at fault — so be sure the CCL files you select to use with the LanRover/L already work correctly with ARA.

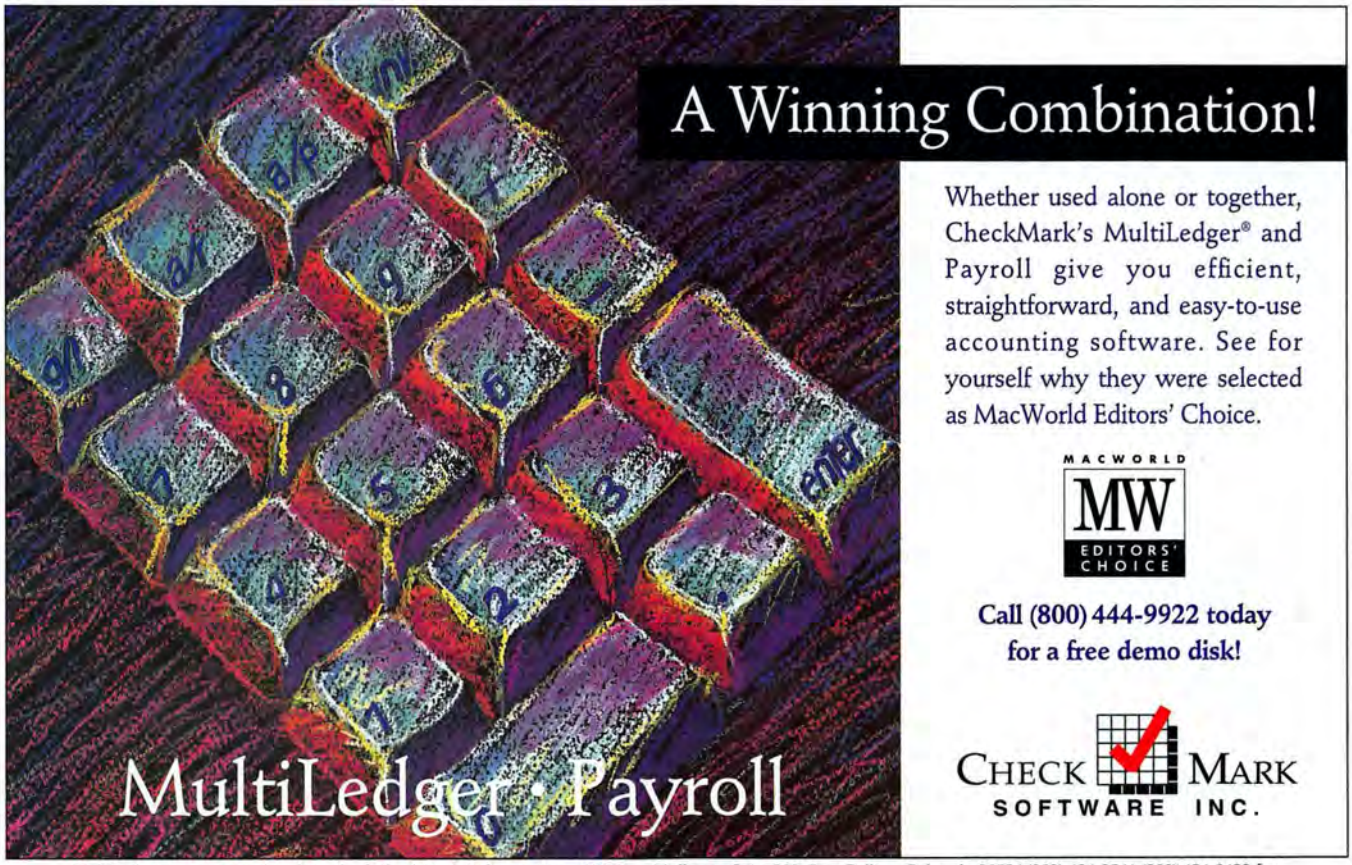
As well as employing it for remote connection, you can also use the LanRover/L as a network modem, much as you would use Shiva's NetModem products. To do so, you need to install the necessary software (included with the LanRover/L) on the Macintoshes of network users.

A detail of importance to network administrators is that the LanRover/L acts as a half-router on a network and emits RTMP (Routing Table Management Protocol) packets. For the unwary administrator, these unexpected packets can cause no end of confusion.

Overall, the LanRover/L admirably serves its purpose, and it's simple to set up, configure, and maintain. Although it has its limitations — the single serial port allows just one connected modem, and the network connection is LocalTalk only — we recommend the LanRover/L as a reliable alternative to dedicating a more costly Macintosh to the task of remote connection.

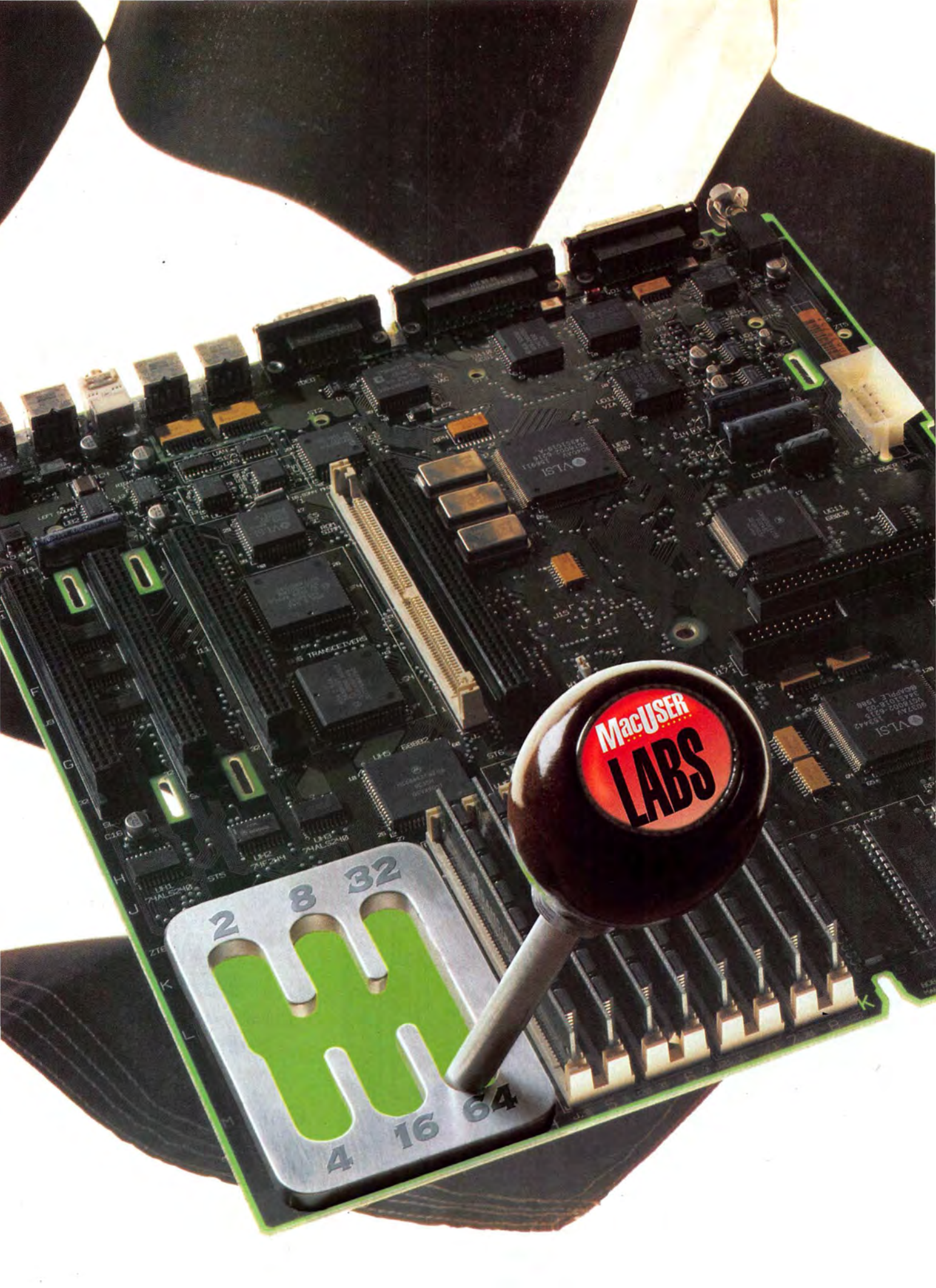
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— Stephan Somogyi



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# Maximum RAM

*The ultimate guide to memory for your Mac — where to buy it, how to install it, and why you need so much of it.*

BY TOM PETACCIA

Probably the question you get asked most about your Mac — from idle conversation at user-group meetings to technical-support calls — is, How much RAM do you have? Chances are, it's not enough, at which point you need to get answers to a couple of even more important questions: How much RAM do you need, and how do you go about adding more to your Mac?

RAM (random-access memory) is the electronic fuel that runs your Macintosh's operating system and applications. If you don't have enough, you won't get very far. RAM is composed of *integrated circuits* ("chips") that are wired into your computer's logic board, snapped in as separate memory cards, or both, depending on your Mac's configuration (see Table 1). RAM is measured by capacity in kilobytes (K) or megabytes (MB) and by speed in nanoseconds (ns).

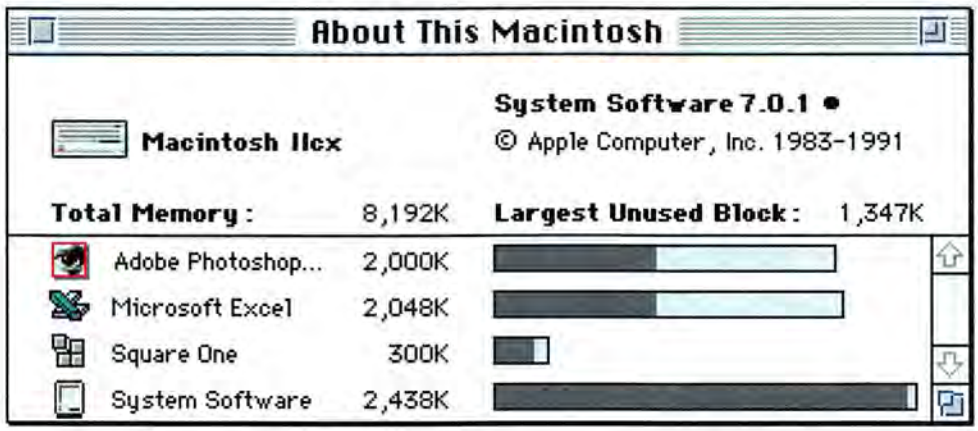



Figure 1: To see how much RAM you have, choose About This Macintosh from the Apple menu. Turn on Balloon Help, and point to each application to find out how much RAM each application is using and how much is allocated to it.

A common error is to confuse RAM with storage (such as hard-disks, floppy disks, and other media). That's an easy mistake to make, in that both RAM and storage are often referred to as memory and have to do with things inside the computer, which most Mac users never see. But unlike data that is stored on a hard disk, data stored in RAM is *volatile;* that is, once the Mac's power has been turned off, the data is lost (unless you've saved it to a disk). RAM's advantage is speed — your Macintosh can access data in RAM much faster than it can access data stored on a hard disk. When you open an application or document, some or all of it is loaded into RAM, so you can access it much more quickly.

A simple way to remember the difference between RAM and storage is to picture your computer as a digital desk: The RAM is the top of the desk; your hard disk or other storage medium is the desk drawers. There is a limit to how much you can take out of your desk drawers and still have enough room to work comfortably on your desk without having something "crash" to the floor. By analogy then, the more RAM you have, the more things (or the larger the things) you can comfortably work with on your Mac.

The good news is that RAM prices are constantly dropping. Since 1988, the cost of 1-megabyte SIMMs (single in-line memory modules — the most common type of memory-expansion card for the majority of Mac models) has dropped more than 95 percent. Many vendors are selling SIMMs for less than $30 per megabyte. You can buy 4-megabyte SIMMs for less than $100 each. Higher-capacity SIMMs (8- and 16-megabyte) and other RAM-expansion cards (for PowerBooks, for example) are still a bit on the high side, but their prices are coming down as well.

### RAM Hogs

If you don't have enough memory, you probably aren't working very productively. Too little RAM prevents you from having several applications open at once (or using MultiFinder in System 6), limits the number of extensions you can use to customize your system, and may result in crashes or constant messages informing you that you don't have enough memory to run a particular program. Unless your work on the Mac is limited to basic word processing and simple spreadsheets, you'll benefit from purchasing more RAM than was included when you bought your Mac (see Table 1). To find out how much RAM you have, choose About This Macintosh from the Apple menu in System 7's Finder (see Figure 1). If you're running System 6, choose About the Finder, also on the Apple menu.

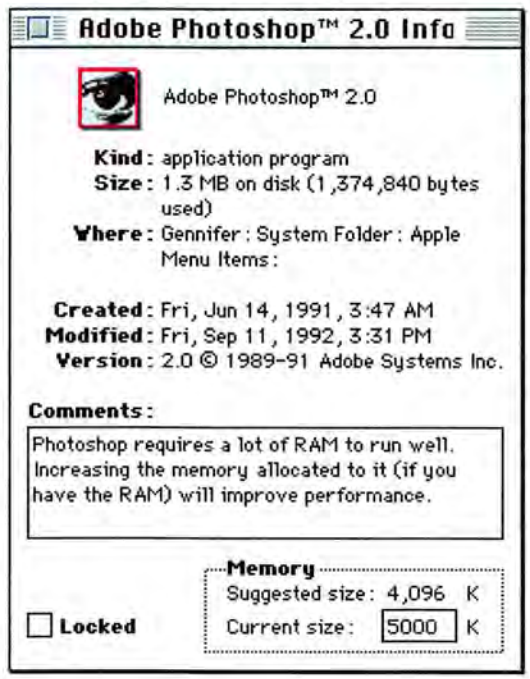



Figure 2: You can change the amount of memory allocated to an application in its Get Info box. To do so, highlight the application's icon in the Finder and press Command-I (Get Info). Allocating more than the suggested size will probably help the application work faster, but if you're short on memory, you can also try allocating less than the suggested amount of memory.

The vast majority of mainline productivity software (word processors, spreadsheet programs, graphics programs, database programs, and so on) require at least 1 megabyte of RAM to work well. Many programs, especially graphics programs, need a great deal more. In addition, many applications simply work better and faster if they have more RAM assigned to them than the default RAM allocation the manufacturer assigned at shipment (Adobe Photoshop is an excellent example). You can easily change the RAM allocation in the Get Info box in the Finder (see Figure 2) — but only if you have enough RAM to do so.

If you install *extensions* (files that enhance your system in various ways), you'll make computing more productive and enjoyable but you'll also eat up RAM. A few extensions are included with the Apple system software (File Sharing, AppleShare, and Easy Access, for example) or are available as add-ons from Apple, but most extensions come from commercial developers (Now Utilities, for example) or are available from on-line services as shareware (SoundMaster, for example). Unfortunately, running even a few extensions consumes a sizable chunk of memory. If you're not sure how many extensions you have installed, reboot your Mac and count the number of icons that line up across your screen at startup or use an extension manager (such as Apple's Extensions Manager) to count the number of extensions you have installed. Having a lot of extensions isn't necessarily a problem, as long as you have enough RAM to accommodate them.




**Figure 3: Each SIMM has its capacity and speed printed on the side of the module. All manufacturers differ in how they present this information, but in general, the numbers before the dash (in this case, 256) indicate capacity and the numbers after the dash (in this case, 80) indicate speed, so this SIMM is 256K and has a speed of 80 nanoseconds.**

System 7 is another RAM hog. There's no doubt that this latest generation of system software provides a wealth of productivity benefits — aliasing, file sharing, the ability to have several applications open at once — but those extras require more RAM than was needed for previous generations of system software. Apple used to say that you could run System 7 on any Mac with 2 megabytes of RAM. But even without adding extensions, and keeping fonts to a minimum, System 7 alone consumes 1.2 to 1.5 megabytes of RAM (depending on which Mac you have). Because that doesn't leave much room to run your applications, Apple has now changed the party line to say you need at least 4 megabytes of RAM to adequately run System 7.

### How Much Is Enough?

We recommend at least 4 megabytes of RAM. For System 6 users, this is probably a comfortable amount to work with, depending on what software you run. For System 7 users, 4 megabytes of RAM is enough to run the system and one, maybe two, applications simultaneously. However, you still have to watch how many extensions you have installed.

For most users, 8 megabytes is a good, functional amount of RAM (unfortunately, it's not possible to install that much in a Mac Plus, SE, or Classic). With 8 megabytes, you can install a nice collection of extensions and keep three to four applications open.

If you do a lot of graphics or CAD work or have a tremendous appetite for extensions, you'll probably work most comfortably with 16 to 24 megabytes of RAM. If you are doing extremely heavy graphics work (especially with Photoshop) and have a Quadra 950, you're able to go up to 256 megabytes of RAM.

Theoretically, current versions of System 7 can accommodate 1 gigabyte (GB) of RAM — in fact, System 7's architecture is capable of supporting up to 4 gigabytes — but in reality, there's a limit to the amount of RAM a Mac can use, depending on the amount of RAM on the logic board and the number of SIMM slots. The amount of RAM is also limited by the density of the SIMM chips, which currently tops out at 16 megabytes.

What's more, only Macs running System 7.0 and later can access more than 8 megabytes of RAM and then only with 32-bit addressing turned on (see the "Memory Controls" sidebar). If you have a Mac SE/30, II, IIx, or IIcx and have not yet installed System 7.1, you must install Connectix's MODE32 utility (it overcomes Apple's "dirty ROM" syndrome) in order to turn on 32-bit addressing. MODE32 is available free from dealers, user groups, and on-line services.

Running with 32-bit addressing means that all of your applications and extensions must be "32-bit clean." If you have kept your software current, this requirement shouldn't be a problem, but if you're using older versions of some software (more than 18 to 24 months old, say), you may want to check with the publishers about upgrading your applications.

It's easy to detect if an application or extension isn't 32-bit clean: Your Mac bombs when you try to use that software. In the case of an extension, the system bombs

## Installing RAM

After you've bought your RAM, you have to install it. For most Macs, installation is pretty easy, but be aware that you will void your warranty if you damage anything while installing memory yourself; in the case of compact Macs and PowerBooks, merely opening the case yourself voids the warranty. Consider having an authorized Apple dealer do the installation. Most dealers don't require that you purchase the RAM from them and will probably charge you for no more than one hour's worth of work.

If you choose to install the memory yourself, observe certain safety precautions. In most cases, you should keep your Mac plugged in but turned off. You're dealing with sensitive electronic components — one static spark, and you can zap your investment (and/or yourself). To avoid this, all you have to do is ground yourself. You can simply touch the Mac's power supply (that metal box with power ratings on it) once you've opened your Mac, but a safer method is to buy an inexpensive disposable grounding wrist strap Ⓐ from an electronics store. You can also buy industrial-grade grounding straps, which last longer.

Do not remove the new SIMMs from their protective package until you're grounded. Store old SIMMs in the packages. You can reuse them to diagnose problems that may be RAM-related.




If you'll be installing RAM yourself, make sure you get all the information you'll need to do so, such as a video or illustrated booklet outlining the steps, from the RAM vendor. Ask what special tools you'll need, such as a Phillips-head screwdriver Ⓑ, Torx screwdrivers Ⓒ and Ⓓ, a case cracker Ⓔ (which also includes a Torx screwdriver), or a SIMM remover Ⓕ — some vendors include these gratis.

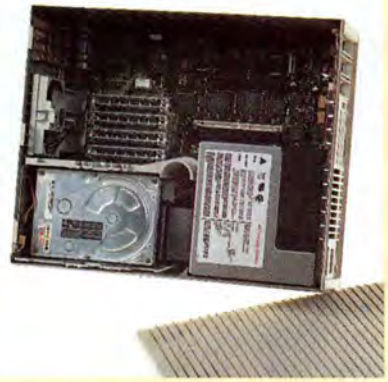
### Performa 400 and 600, IIvx, LC, LC II, II, IIx, IIcx, IIsi, IIci, IIfx, and Quadra 900 and 950

Remove the lid, which may be secured by a screw (lately Apple has started shipping these computers without the holding screw), so you may need a screwdriver. When you have the lid off, you should quickly be able to locate the SIMM banks — neat rows of upright little cards ❶.

**Note:** If you are mixing RAM sizes (four 1-megabyte SIMMs and four 256K SIMMs, for example), the same sizes must be together in each RAM bank.

If you're replacing existing SIMMs (exchanging 256K SIMMs for 1-megabyte SIMMs, for example), *gently* pull aside the tabs holding in each SIMM and slightly push back the SIMM. It should unseat and rest at a 45-degree angle, where you can just lift it out. Using a SIMM remover Ⓕ, which you can buy at a computer-supply store, is a safer bet ❷.

❶



❷



After the old SIMMs are out, put in the new SIMMs by sliding them into the sockets at a 45-degree angle and then gently pulling forward until you hear a faint click (on the IIcx and IIci, it may sound more like a slight crunch). Put the lid back on, and return the holding screw, if necessary. Double-check to make sure that both tabs are attached (this applies to all Macs except PowerBooks).

## Plus, SE, SE/30, Classic, Classic II

Installing RAM on a compact Mac requires a little more work and some special tools. You'll need a Torx screwdriver with a long handle Ⓒ to reach the screws that are in the Mac's handle and a special device known as a Mac cracker Ⓔ to separate the housing from the chassis. Do not plug in compact Macs when installing RAM. Remove the two screws on the handle and the two screws on the back of the machine (if you have a Mac Plus, you also have to remove the screw inside the battery slot). Place the Mac cracker in the groove just behind the front of the unit, and gently squeeze to open the unit❸. Make sure you're grounded. ***Be extremely careful not to touch the back of the picture tube. It contains a good dose of static electricity, which can cause serious injury or death; it is also very sensitive and damages easily.*** Remove all the drive cables and the power cable; lay the Mac face down. Slide the motherboard up until you can pry it out from the right ❹. The speaker wire is still attached; remove it by pulling off the connector. Remove and replace the SIMMs as described above.

**Note:** Adding RAM to a Mac Plus and some early SEs also requires that you cut a resistor wire ❺. Many SIMM resellers include an installation guide (some even give you a video) to help with this somewhat tricky installation.

❸



❹



❺



## Quadra 700

The RAM on the Quadra 700 is located underneath the floppy-and-hard-drive assembly, so you have to remove the power supply and the drive assembly before you can install the SIMMs. After you've removed the lid, you'll see on the disk assembly a plastic "finger," a bracket pressing next to the power supply. Pull this bracket toward the front of the Mac to release the power supply, and pull it straight up and out of the Mac ❻. Then undo the single screw on the disk assembly, using a Phillips-head screwdriver Ⓑ; unplug the drive cables; and pull a similar finger on the assembly toward the Mac housing and remove the assembly. Remove and install the SIMMs ❷, and reassemble the unit.

❻



## PowerBooks

Using the correct Torx screwdriver Ⓓ, remove the screws from the bottom of the unit plus the one located under the port cover. Gently remove the cover halves. Looking at it from the back, you see the slot where the PowerBook RAM-expansion card goes ❼. Seat the card in the slot. For some 4-megabyte and 6-megabyte cards, a protective plastic or rubber pad must be placed on the card to prevent contact with the metal lining of the PowerBook case, because contact with the lining can short the card.

When putting the PowerBook back together again, make sure the video cable is attached, otherwise you won't be able to start up.

❼



when it tries to load its code during startup. To remove the offender, use an extension manager or hold down the Shift key on startup until you see "Welcome to Macintosh. Extensions off." You can then open your Extensions folder (inside the System Folder) and remove the offender.

### SIMM-Buying Basics

Unless you're a PowerBook owner, you can upgrade your Mac's RAM by adding SIMMs to specially allocated memory banks inside your Mac. (PowerBooks need snap-in memory-expansion cards.)

SIMMs are small cards comprising two or eight DRAM (dynamic RAM) chips that are rated by speed. Speeds range from 150 nanoseconds (slow) to 70 nanoseconds (speedy). You need to buy at least the minimum speed required for your Mac (see Table 1). Your Mac can use faster SIMMs, but they won't improve performance.

Two-chip SIMMs are special 1-megabyte cards that can be used by the Performa 400, LC, LC II, IIsi, and Quadra machines. The two-chip configuration provides a slight cost advantage (one or two dollars per megabyte). Eight-chip SIMMs are available in 256K and 1-, 2-, 4-, 8-, and 16-megabyte capacities; what SIMM capacities you can use depends on what Mac model you have (see Table 1).

SIMMs are arranged in one, two, or four banks, depending on which Mac you have. Each bank contains two or four sets of SIMMs each, and the SIMMs in each bank must be the same size and speed as the others in the same bank. Within your Mac, you can mix SIMMs of different sizes and speeds, but not within the same bank. For example, a Mac IIci has two four-SIMM banks. One bank might contain four 80-nanosecond, 256K SIMMs, and the other might hold four 70-nanosecond, 4-megabyte SIMMs, for a total of 17 megabytes of RAM.

You may also see the terms *low-profile* and *high-profile* used to describe SIMMs, depending on how high the chips stand up from the board. Low-profile SIMMs are used in cases where space is tight within the Mac; in a Quadra 700, for example, the standard 16-megabyte SIMMs don't fit, so a special low-profile configuration is necessary.

Mac IIfx owners need to buy specially configured SIMMs, because Apple changed the design for that model only. IIfx SIMMs are a bit more expensive than SIMMs for other models but usually by only a few dollars per megabyte.

If you want to add RAM to a Mac Classic, you have to purchase a RAM-expansion card that can accept 256K or 1-megabyte SIMMs. Classic owners can also buy a special 3-megabyte expansion card. Either way, the maximum RAM a Classic can accommodate is 4 megabytes. The Classic II uses standard SIMMs; no expansion card is necessary.

The PowerBook 100, 140, 145, 160, 170, and 180 require expansion cards that use *pseudostatic* (low-power) RAM (PSRAM) cards, which are actually specially designed DRAM cards. The new PowerBook Duos use DRAM rather than PSRAM.

### Memory Maxers

If you can't upgrade your RAM, because of budget or machine limitations, here's how to get the most mileage out of what you already have:

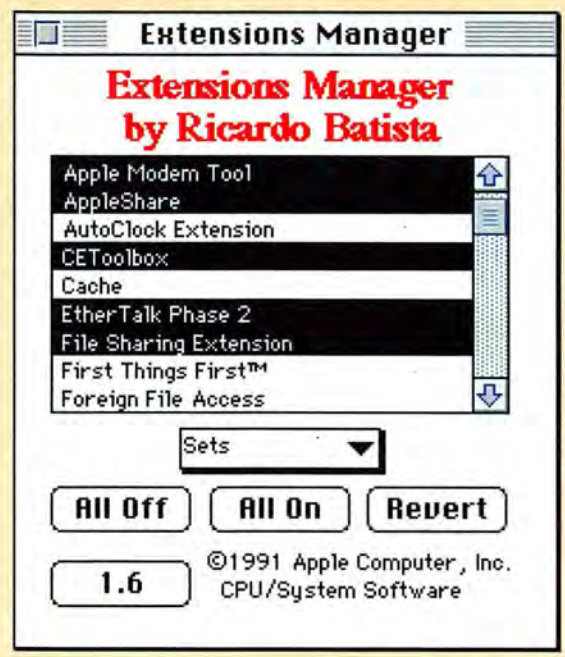
**1. Weed out your Extensions folder.** Be brutal: Even some of the items Apple's System Installer puts into your System Folder (DAL and Easy Access, for example) may be unnecessarily eating up available memory. As for other extensions, well, you may be in love with your Oscar the Grouch trash extension, but if you're constantly getting "out of memory" messages, he'll have to go too. Using an extension manager such as Apple's Extensions Manager makes the job a lot easier, especially because most let you save different sets of extensions for specific activities (for using QuickTime, for example).

**2. Turn off File Sharing** (in the Sharing Setup control panel) if you aren't using it.

**3. Lower the size of your disk cache** in the Memory control panel.

**4. Install a font-and-sound manager** such as Fifth Generation Systems' Suitcase or ALSoft's MasterJuggler. Using one of these extensions means that you don't have to have all your fonts and sounds installed in your System file.

**5. Reinstall your system software.** Move your existing System file out of the System Folder, and trash it. Then use the Installer's Customize option to install the version of system software that's specially configured for your Mac. This saves both RAM and hard-disk space by excluding code that's not needed for your particular machine.

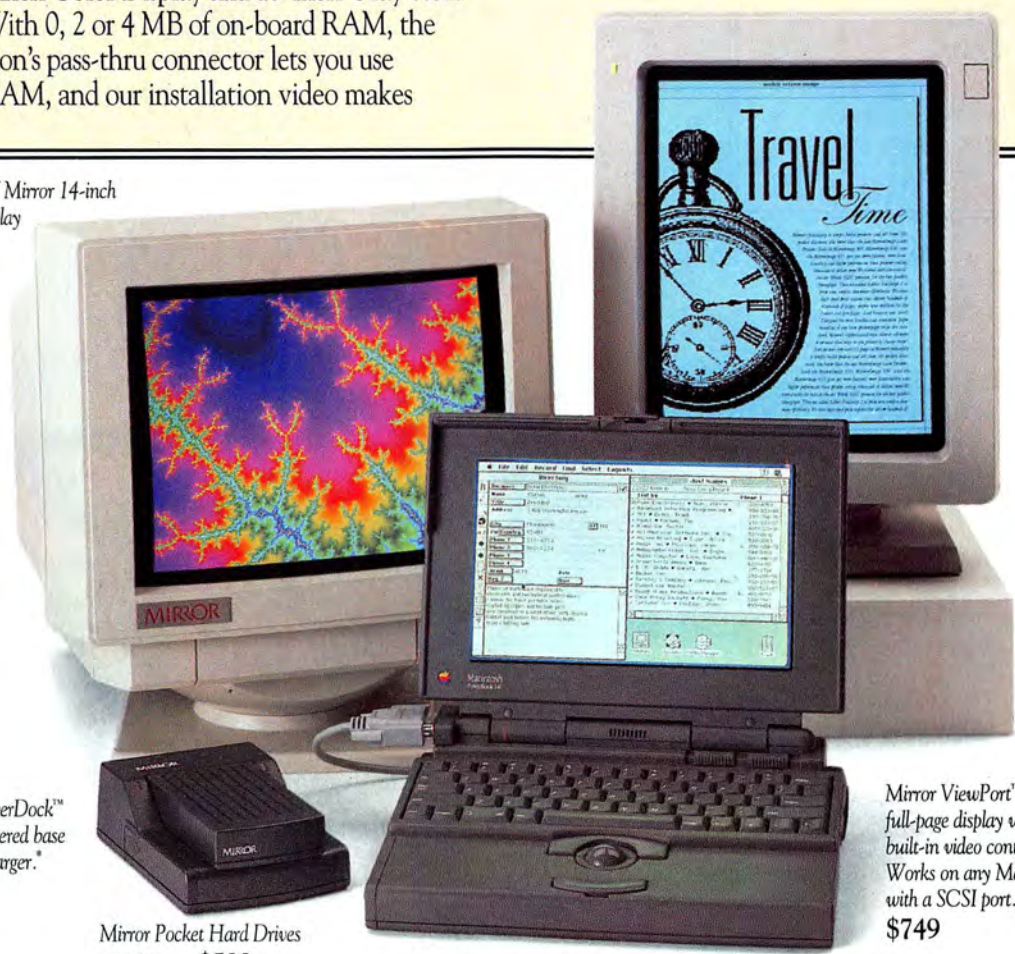


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| 425 MB (Q) | $1,049 | $1,099 |
| 595 MB | N/A | $1,499 |
| 1 GB | N/A | $1,999 |
| 128 MB Optical Drive | | $1,299 |
| 44 MB SyQuest Drive | | $429 |
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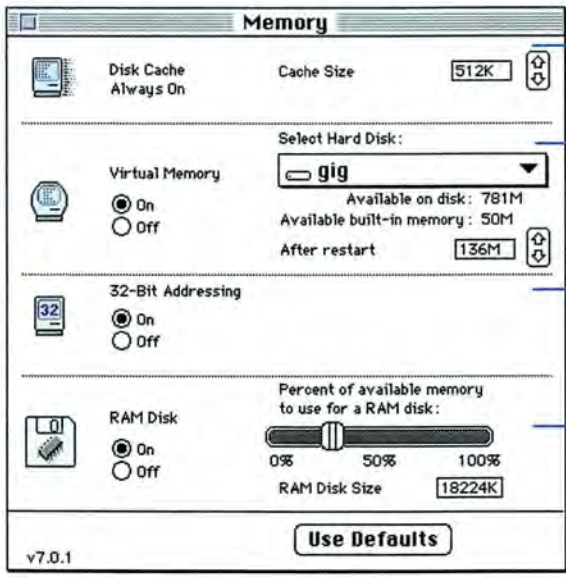
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**CIRCLE 118 ON READER SERVICE CARD.**

## Memory Controls

Here's a guided tour of System 7's Memory control panel. Note that not all Macintoshes are able to use the 32-Bit Addressing and RAM Disk options.




**Disk Cache.** The disk cache sets aside RAM for storing frequently accessed files, meaning that it robs RAM from applications that need it. Keep your disk cache set to 128K or lower.

**Virtual Memory.** Virtual memory is a trick whereby the computer assigns part of the hard disk as RAM. Hard-drive speeds are much slower than RAM speeds, so if you use the virtual memory that comes with System 7, you'll notice a significant slowdown in performance. It's OK in a pinch, but you'd do better by upgrading to real RAM.

**32-Bit Addressing.** This option lets all but 68000-based Macs (the SE, the Plus, the PowerBook 100, and the Classic) use more than 8 megabytes of RAM. If you have an SE/30, II, IIx, or IIcx without System 7.1, you must install Connectix's MODE32 utility in order to turn on 32-bit addressing. To avoid crashing, make sure your applications are "32-bit clean" (most current applications are).

**RAM Disks.** A RAM disk is just the opposite of virtual memory: It assigns a portion of RAM as a hard disk. And because RAM can run much faster than a hard drive, you can dramatically speed up performance. Unlike other Macs, Quadras and PowerBooks let you use the Memory control panel to create RAM disks. There are also commercial products for creating RAM disks, such as Connectix's Maxima, and shareware RAM-disk-creation programs, such as AppDisk.

If you look in the back of *MacUser* or other computer magazines, you'll find many ads from vendors touting the latest RAM prices. Go ahead and buy your RAM from a mail-order house; before you do, however, it's a good idea to ask around (friends, associates, user groups, on-line services) and get recommendations about which supplier provides the best combination of price, delivery, and service (for more on buying RAM, see "How to Buy Memory," February '92, page 259).

### Other Kinds of RAM

In addition to operating RAM, the LC, LC II, Performa 400 and 600, and Quadra-series Macs also use special video RAM (VRAM), which lets you increase your monitor's color depth (the number of bits), depending on the monitor size, without having to purchase a separate video card. A couple of caveats: Standard SIMMs cannot be used in VRAM slots, and the LC and Quadra VRAM is not interchangeable.

Many laser printers can also accept RAM expansion. Upgrading your printer's RAM means you can handle more downloadable fonts and work faster. The Apple LaserWriter IIf and IIg can use standard 1-megabyte SIMMs, so if you've just replaced the 1-megabyte SIMMs in your Macintosh with higher-capacity cards and you have a LaserWriter IIf or IIg, you can recycle those one-meggers by installing them in your printer. Other Apple laser printers and those from third parties require special memory modules that are best installed by a dealer or authorized technician.

With more-sophisticated applications and System 7 now in wide use, memory is being gobbled up in ever greater amounts. Fortunately, it is no longer an expensive proposition to get all the RAM you need. Buy as much as you can afford and can fit into your Mac, and you'll be a happier and more productive computer user. It's the most cost-effective Mac purchase you'll ever make.

**Tom Petaccia is an independent Mac consultant based in Charlotte, North Carolina.**

## Table 1 Criteria

**Minimum configuration** — The smallest amount of RAM, in megabytes, included on the Mac at purchase. Current models reflect minimum RAM configurations from the Apple price list current at press time. "On board" RAM is soldered onto the CPU logic board; "slots" signifies removable SIMMs in RAM-expansion slots.
**Slots** — The total number of SIMM slots available for expansion (includes those from minimum-configuration category, if any).
**SIMM/card capacities** — The size, in kilobytes or megabytes, of SIMMs or expansion cards that the Mac can use.
**Minimum RAM speed** — The minimum RAM speed, in nanoseconds, that the Mac model requires.
**Possible configurations** — Potential RAM totals, in megabytes, based on use of the various acceptable SIMM sizes.

*continues* ►

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## Table 1: How Much RAM Can You Add?

| Macintosh | Minimum configuration | Slots | SIMM/card capacities | Minimum RAM speed | Possible configurations | Notes |
|---|---|---|---|---|---|---|
| Plus, SE | 1 MB (slots) | 4 | 256K; 1 MB | 150 ns | 1, 2, 4, 5 MB | * † |
| SE/30, IIcx | 1 MB (slots) | 8 | 256K; 1, 4, 16 MB | 120 ns | 1, 4, 5, 8, 16, 17, 32, 64, 65, 128 MB | * † § |
| II | 1 MB (slots) | 8 | 256K; 1, 4, 16 MB | 120 ns | 1, 4, 5, 8, 16, 17, 32, 68, 128 MB | Requires FDHD upgrade and PMMU chip to use 4-MB-and-higher SIMMs.§ ◊ |
| IIx | 1 MB (slots) | 8 | 256K; 1, 4, 16 MB | 120 ns | 1, 4, 5, 8, 16, 17, 32, 68, 128 MB | § ◊ |
| Classic | 1 MB (on board) | expansion card | 256K; 1 MB | 150 ns | 1, 2, 4 MB | ** |
| Classic II/ Performa 200 | 4 MB (2 on board; 2 in slots) | 2 | 1, 2, 4 MB | 100 ns | 4, 6, 10 MB | |
| LC | 2 MB (on board) | 2 | 1, 2, 4 MB | 100 ns | 4, 6, 10 MB | |
| LC II/ Performa 400 | 4 MB (on board) | 2 | 1, 2, 4 MB | 100 ns | 4, 6, 8, 10 MB | Although physical RAM can total 12 MB, CPU can address only a maximum of 10 MB. |
| IIsi | 3 MB (2 on board; 1 in slot) | 4 | 256, 512K; 1, 2, 4, 8, 16 MB | 100 ns | 1, 2, 3, 5, 9, 17, 33, 65 MB | |
| IIci | 5 MB (slots) | 8 | 256, 512K; 1, 2, 4, 8, 16 MB | 80 ns | 1, 2, 3, 4, 5, 6, 8, 9, 10, 16, 17, 18, 32, 33, 64, 65, 68, 128 MB | |
| IIfx | 1 MB (slots) | 8 | 256K; 1, 4, 8, 16 MB | 80 ns | 1, 2, 4, 5, 8, 9, 16, 17, 32, 33, 64, 65, 128 MB | ◊ |
| IIvx/ Performa 600/600 CD | 4 MB (on board) | 4 | 256K; 1, 2, 4, 8, 16 MB | 80 ns | 4, 5, 8, 12, 20, 36, 68 MB | |
| Quadra 700 | 4 MB (on board) | 4 | 1, 4, 8, 16 MB | 80 ns | 4, 8, 20, 36, 68 MB | Need to remove power supply and disk assembly to install.* |
| Quadra 900/950 | 8 MB (slots) | 16 | 1, 4, 8, 16 MB | 80 ns | various, up to a total of 256 MB | |
| PowerBook 100 | 2 MB (on board) | expansion card | 2, 4, 6 MB (cards) | 100 ns | 2, 4, 6, 8 MB | * † |
| PowerBook 140/145/170 | 2 MB (on board) | expansion card | 2, 4, 6 MB | 100 ns | 2, 4, 6, 8 MB | * † |
| PowerBook 160/180 | 4 MB (on board) | expansion card | 4, 8 MB | 100 ns | 4, 6, 8, 12, 16 MB | * † †† |
| PowerBook Duo 210/230 | 4 MB (on board) | expansion card | 4, 8 MB | 100 ns | 4, 8, 12, 24 MB | * † †† |

*User installation voids warranty.

†Requires special Torx screwdrivers and/or Mac-cracker tool.

§MODE32 required to access more than 8 MB of RAM if System 7.1 not installed.

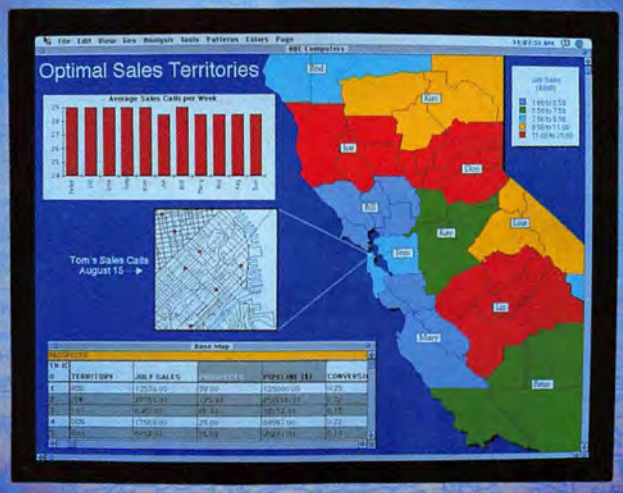
◊Requires special SIMM configurations. II/IIx format different from IIfx.

**Requires expansion card.

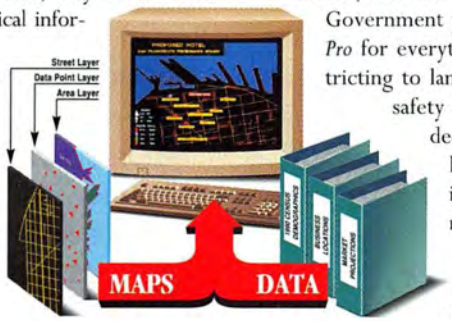
††Expansion-card sizes represent Apple offerings only. At press time, no third parties had announced higher-capacity cards that would up the unit to the maximum possible RAM.

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**CIRCLE 187 ON READER SERVICE CARD.**

# Setting the New Standard:

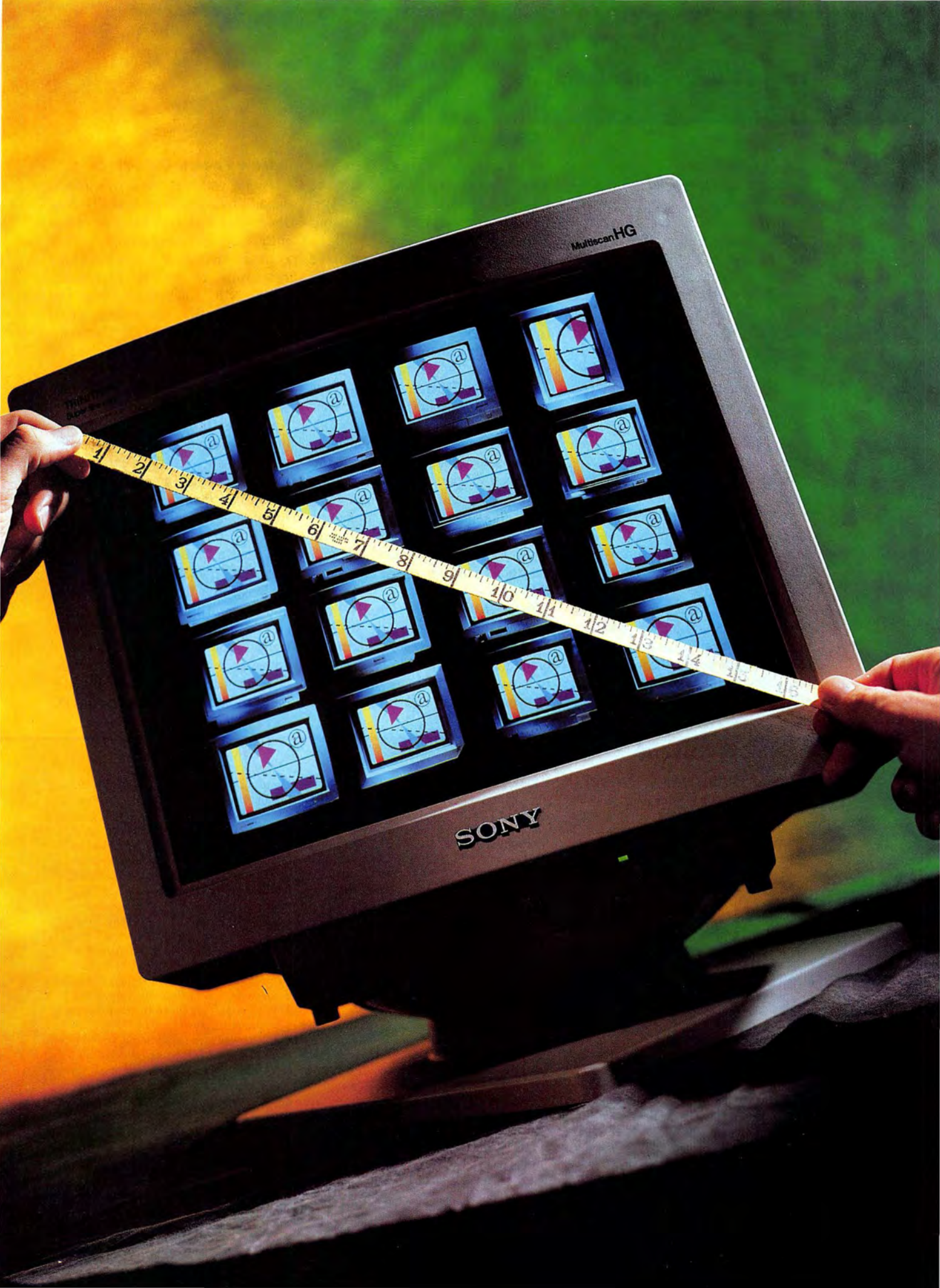
# 16-Inch Color Monitors

*Not too big, not too small — 16 inches looks just right. One of these 16 midsized monitors will make your old 13-incher obsolete.*

**BY WINN L. ROSCH**

We never did like the number 13. Apple apparently agrees. The Quadras' built-in video circuitry has advanced past the 13-inch standard to support 16-inch monitors in full 24-bit color. Apple has replaced the familiar 13-inch AppleColor High-Resolution RGB Monitor with the new 14-inch Macintosh Color Display. Apple also now offers a 16-inch monitor. Unlucky 13 is gone. Sweet 16 is here.

PHOTOGRAPHY: WALT DENSON


MultiscanHG
SONY

# 16-Inch Color Monitors

A 16-inch display is more than a comfort to the superstitious — it gives 70 percent more pixels than the old 13-inch standard model. That translates as more cells in your spreadsheets and more words in your word-processing documents. With prices of 16-inch monitors starting at less than $1,000, even the average Joe or Jane can justify the cost of these bigger screens — and because 9 of the 16 monitors we tested come from aggressive vendors in the PC market that are veterans of vicious price wars, we expect their entry into the Mac market to force prices to drop even further.

Aside from offering more pixels for your money — 832 x 624 versus the 640 x 480 of the 13-inch standard — 11 of the products in this roundup are *autosynchronous* monitors that can automatically display a variety of timings and resolutions when connected to a Mac or a PC. *Autosyncs*, as they're commonly known, are of particular benefit if your office has both types of computers and you'd like to standardize on one monitor model. Although early autosyncs were guilty of poor image quality, our tests show that they're now every bit as good as the best Mac-specific models (see "Perfection for Pennies: Autosynchronous Monitors," August '92, page 158).

As 16-inch monitors become more popular — and more affordable — the prices of 19-, 20-, and 21-inch monitors have also dropped. But for most of us, bigger can be too big. For example, the average desk wasn't designed with a 21-inch monitor in mind. And although Cinerama-sized screens work well for specialized applications (painstaking photo editing and full-page desktop publishing), they're more than you need for everyday work. Put a 21-inch, 80-pound behemoth on top of your Mac, and you may find yourself with 3 square inches of remaining desk space and a crushed Mac. Leaving more usable work space on your desktop is a big advantage of 16-inch monitors.

In the 16 products we tested for this report, you'll find pivoting screens, bright phosphors, new tubes, and many brand names new to the Mac market. Better still, overall quality is so high that you can hardly make a bad choice.

## New Faces, Old Prices

Along with the usual Macintosh-specific monitors from Apple, Radius, RasterOps, and SuperMac, we examined some autosync monitors more common on DOS desktops, from Mag Innovision, Magnavox, Mitsubishi, Nanao, NEC, Seiko, Sony, Taxan, and Viewsonic. We also tested a new autosync monitor from E-Machines, historically a vendor of Mac-specific monitors.

Even the most critical measurements we made with our Microvision Superspot 100 System failed to distinguish much difference between the image quality of the Mac-specific monitors and the autosyncs. Indeed, of our two favorite — and best-performing — monitors, one was an autosync (the Sony CPD-1604S) and the other a Mac-specific model (the RasterOps Sweet 16).

Considering the number of vendors, you'd think a price war would be right around the corner, and you'd be partly right. Engineered for PCs, midsized autosync monitors *should* bring the benefit of economies of scale, because they can be sold to Mac as well as PC

## On the Horizon

Just after we finished our testing, Sampo America released its candidate for low-priced leader among midsized autosync monitors, the AlphaScan 17, which has a suggested retail price of $1,295. Billed as Sampo's "economical solution," the AlphaScan 17 uses a shadow-mask tube. In addition, Sampo has introduced a high-end 17-inch monitor, the AlphaScan 17E, which also uses a shadow-mask tube. The 17E uses dynamic beam focusing and offers Sampo's ColorKey color-calibration system. Revised electronics incorporate all-digital controls with 20-setting memory. Sampo America, 5550 Peachtree, Industrial Blvd., Norcross, GA 30071; 404-449-6220.

Nanao's new "budget" 16-inch autosync monitor, the shadow-mask Flexscan F550i, is priced at $1,749. The F550i offers the same, easy-to-use controls as the T560i monitor we tested for this report. Nanao Corp., 23535 Telo Avenue, Torrance, CA 90505; 800-325-5202 or 310-325-5202.

Aiming to push the price of 16-inch Trinitron technology to a new low, SuperMac has introduced the SuperMatch 17T, a companion to the SuperMatch 17, tested for this report. With a retail price of $1,299, it's $100 cheaper than the earlier model. Unlike the current SuperMatch 17, the new model will match the Mac's 13-, 16-, and 19-inch standards. By limiting the new monitor to three resolutions, SuperMac can make all adjustments for image size and position at the factory. Consequently, the SuperMatch 17T doesn't require the all-encompassing SmartTouch controls of the current product — the only controls it has are those for brightness, contrast, and power. SuperMac Technology, 485 Potrero Avenue, Sunnyvale, CA 94086; 408-245-2202.

Philips Electronics began a new monitor line under its own name (the company has produced monitors under the Magnavox name since 1984) with the August 1992 introduction of its FastRefresh/17 at a $1,595 list price. True to its name, the 17-inch autosync monitor can lock to refresh frequencies as high as 120 hertz and supports horizontal-scan rates from 30 to 64 kilohertz. Its Invar shadow mask has a .26-millimeter dot pitch, and its front-panel controls include an LCD display. The FastRefresh/17 can handle resolutions as high as 1,280 x 1,024 pixels, and its universal power supply can automatically adjust for any standard utility power in the world. It conforms to the MPR-II ELF (extremely low frequency) emission standard.

Philips will also be adding a Trinitron monitor with the same screen size and similar features. Both Philips monitors will ship with a Mac Quadra adapter and Mac-oriented instructions as standard equipment. Philips Electronics, P.O. Box 14180, Knoxville, TN 37914; 800-835-3506 or 310-217-1300.

owners. Unfortunately, they haven't — yet.

Those engineered specifically for the Mac were among the lowest-priced products we found. The Radius Color Pivot LE had the lowest price (we found one dealer that offered it for $800, although the average street price was $840) — but you have to add the price of a Color Pivot video card ($599 list) to get it going, unless you use it with an LC II, IIsi, IIci, Quadra, or Performa 400 or 600 (and on these machines, without the card, it runs only at 640 x 480 pixels). However, the Pivots are designed to be full-page displays with a standard resolution of 564 x 760 pixels at 72 dpi — or when pivoted to landscape orientation, a resolution of 760 x 564 pixels. They are not true 16-inch displays; although you can get them to display the standard 832-x-624-pixel 16-inch resolution at 78 dpi, it requires some tricky adjustments to get the screen image properly centered and sized.

Close behind in cost was the SuperMac SuperMatch 17, which we found for as little as $969. The least expensive autosync, the Magnavox CM9217, had an average street price of $995, showing that the price gap between autosyncs and Mac-specific monitors is closing. Far and away the highest-priced monitor was an autosync — the bright, sharp Nanao Flexscan T560i — which had an average street price of $2,020. It offered the most-convenient controls and the best image quality of the bunch.

### More Dots

The higher price of many of the autosyncs buys you the potential of higher resolution as well as cross-platform compatibility. Many of the autosync monitors are rated to produce images with resolutions as high as 1,280 x 1,024 pixels, with the appropriate video card.

Most of the resolution claims are of little value to Mac users, however. The highest resolution supported by on-board Mac circuitry — 1,152 x 870 pixels on the Quadras (16-bit color on the 950, 8-bit on the 900/700) — is still too many pixels for even a 21-inch screen to display a 72-dpi image. (72 dpi is the standard for WYSIWYG [what you see is what you get] screen-to-printer conformance). On a 16-inch screen, 832 x 624 pixels results in 72-dpi, WYSIWYG resolution — a higher resolution makes images on-screen appear smaller than when printed. This can be a problem if you're a desktop publisher or an artist who needs to work in the world of WYSIWYG — if you're not, the good news is that a higher dpi number will let you cram more onto your screen; the bad news is that what you cram will be quite small.

All the monitors tested for this report support the 832-x-624-pixel 16-inch standard. It's called the 16-inch standard because on monitors with a screen size of 16 inches, the image is displayed at 72 dpi. Displaying 832 x 624 pixels on a monitor smaller than 16 inches shrinks the image size, thus raising the dpi count and consequently making the image non-WYSIWYG.

Of the 16-inch autosync monitors we tested, all can display the 640-x-480-pixel 13-inch standard in addition to the 832-x-624-pixel 16-inch standard. Of the Mac-specific monitors, only the SuperMac SuperMatch 17 has this ability. If you have a video card that can support only 640-x-480-pixel resolution, you can run a 16-inch autosync or the SuperMac monitor at that resolution and then upgrade your card later to take advantage of the monitor's higher resolutions.



**With a list price of $1,749, Nanao's new shadow-mask Flexscan F550i is aimed at the low end of the 16-inch-monitor price range — it's almost $1,000 less expensive than the Flexscan T560i we tested for this report.**

### Monitor as Transmitter

The disadvantage of autosyncs, aside from their higher prices, is difficulty of installation. Few makers of autosync monitors bother to tailor their instructions for Mac installation. Three (Nanao, Sony, and Taxan) don't even mention the Mac in their documentation. Even worse, the Viewsonic V7 we received had no manual at all — we had to ask for one (the one the company sent us did cover Macs, though).

This lack of proper instructions is only part of the problem when you hook up an autosync. Even though all the vendors who submitted monitors

for this report knew that the monitors were going to be tested on Macs, nearly all of them failed to provide the cables or adapters needed to connect to a Mac. Mag Innovision, Mitsubishi, Nanao, Sony, Taxan, and Viewsonic all make Mac cables an extra-cost option, whereas a PC-style connector is standard equipment.

We also discovered that the FCC certification of the E-Machines, Mitsubishi, Nanao, NEC, RasterOps, Seiko, and SuperMac monitors is Class A, not the more stringent Class B. As Class A monitors, they're legal for sale in commercial environments only. If you use one of these in your home and disrupt your neighbor's TV reception, it's your responsibility to end the disruption.

### Even the Worst Is OK

In the past, monitor testing often came down to a battle of tube technologies, with the Trinitron monitors generally outperforming those using shadow-mask tubes. But today, how the CRT (cathode-ray tube) actually puts the picture in front of you doesn't seem to matter quite as much.

A CRT is a glass bottle with electron guns mounted in the small end that illuminate phosphors deposited on the inside of the wide end (the screen). To allow the electron beam to strike the correct phosphor for each color (red, blue, or green), each tube contains a metal mask between the gun and the phosphors. A Trinitron tube uses a mesh of fine, tightly stretched vertical wires, whereas a shadow-mask tube uses a perforated sheet of metal (see "Big Screens for Small Macs: Mac LC and IIsi Color Display Systems," February '92, page 156).

Despite their well-deserved reputation, Trinitron tubes are no longer alone at the top. Judging from our results, no one tube technology appears to have an edge. Our exhaustive testing with the Microvision Superspot 100 System did confirm what we saw with our own eyes, however: There are definite winners. But — and this is good news for buyers — there are no real losers. You can buy any monitor on our list and get a good image. Unlike in other monitor classes we've examined, the minimum quality level of the 16-inch monitors we tested is entirely acceptable.

### You Gotta Look Sharp

Top on the list of factors that make a monitor "acceptable" is its sharpness — how well focused the images are. To see just how sharp our 16 test subjects really were, we passed each before the steely gaze of our Superspot 100 (see the "How We Tested" sidebar).

The most telling of the tests was our measurement of *MTF* (modulation transfer function), which measured the contrast between very fine lines (1 pixel wide in our tests), alternating between minimum and maximum

## How We Tested

To test these sixteen 16-inch monitors, we used two sophisticated pieces of equipment: a Microvision Superspot 100 System and a Minolta Color Analyzer CA-100. We used the Superspot to measure each monitor's *MTF* (modulation transfer function) and *pincushion distortion*. The Color Analyzer was used to measure the monitors' *maximum usable brightness*.

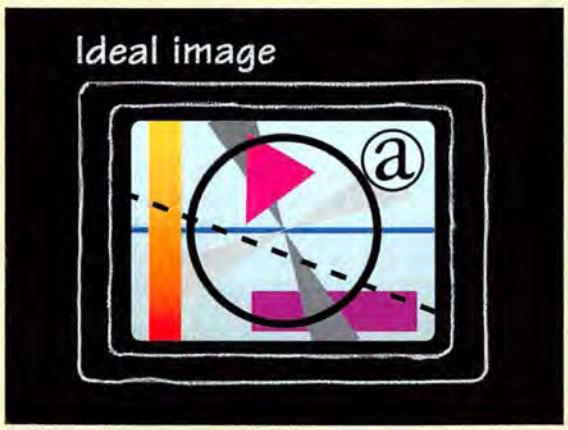
**Lack of Sharpness:**

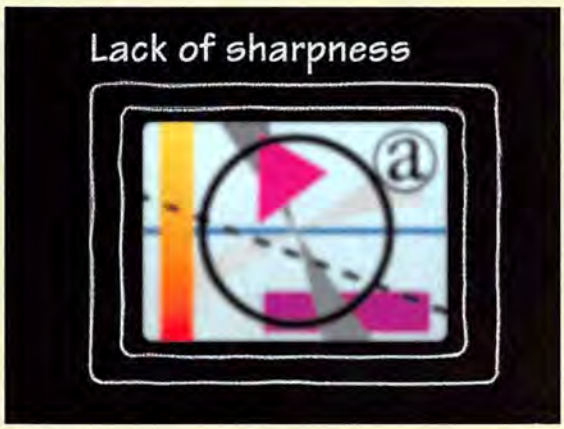
MTF provides a measure of a monitor's sharpness: A higher MTF value means that the monitor can distinguish finer detail. The percentage value is calculated from the contrast between white and black lines. An ideal monitor would give exactly the same brightness ratio for black and white lines spread far apart as for lines that are close together. As lines get closer, however, monitors have difficulty keeping the lines sharply distinct, because the white areas bleed into the black ones. The result is an image that looks fuzzy or blurred.

The most difficult pattern for a monitor to render sharply is alternating white and black lines 1 pixel thick. We used this pattern and the Superspot to measure the MTF of each of the monitors after we had adjusted the brightness and contrast controls to achieve the sharpest, brightest picture possible.

**Pincushion Distortion:**

Pincushion distortion is a measure of a monitor's ability to display straight lines. When a line shows obvious outward



## Figure 1: Beauty by the Buck

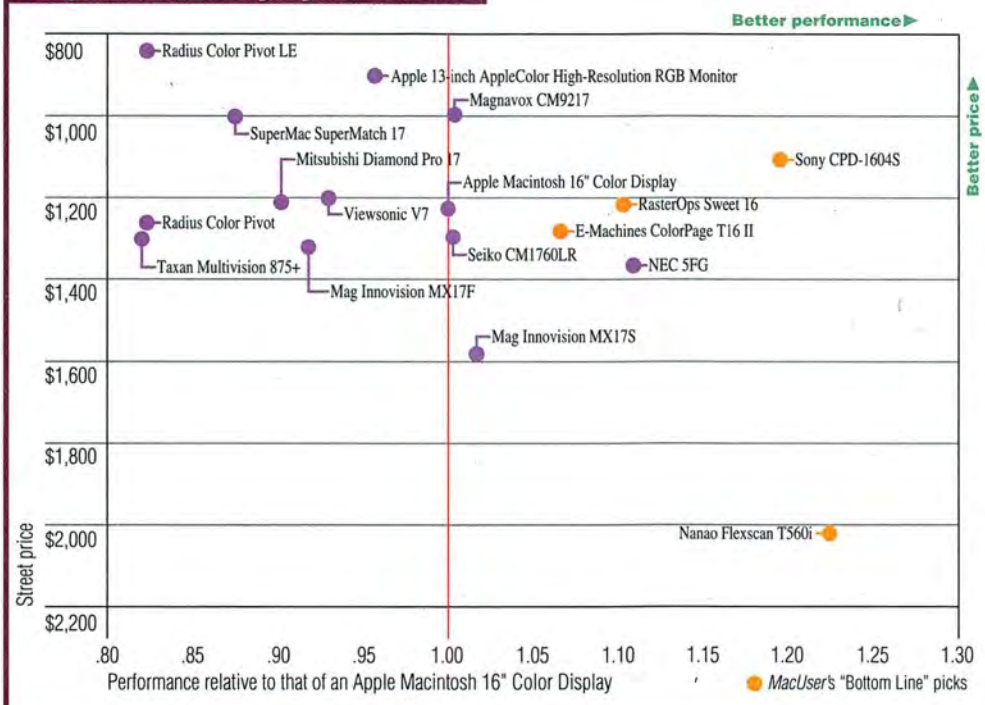



**Figure 1: To find an overall ranking for the 16-inch monitors, we combined each monitor's scores for the sharpness, brightness, and geometry tests and calculated the result relative to that of the Apple Macintosh 16" Color Display. We then plotted each monitor's overall performance rating against the street price to see which monitors offer the best image quality for the money. The familiar 13-inch AppleColor High-Resolution RGB Monitor is included for comparison.**

*bowing* or curving, the monitor is said to have a large pincushion error. A common problem is for the monitor to have very straight lines in the center of the screen and some amount of bowing toward the edges. Most monitors have at least some pincushion distortion because of the difficulty of accurately steering the electron beams along their intended paths. However, some monitors enable users to adjust the degree of pincushion distortion.

We measured the pincushion distortion for both a line in the center of the screen and one at the edge. If the monitor had a pincushion-adjustment control, we adjusted the monitor to the best overall geometry before taking the measurements.

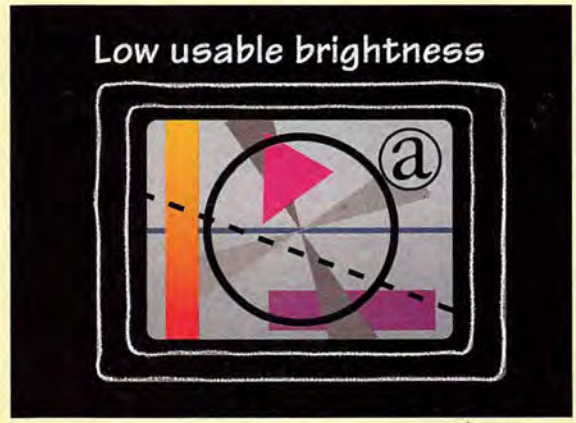
**Low Usable Brightness:**

Maximum usable brightness is a measure of how bright a display can be before the focus is affected. As the brightness is increased, the electron beams that scan across the screen's phosphor become more intense, causing the phosphor glow to spread and the focus to decrease.

We set each of the monitors at its sharpest, brightest setting as determined by the Superspot when taking the MTF measurement. Then we used the Minolta Color Analyzer CA-100 to measure the brightness of the screen when displaying a completely white image.

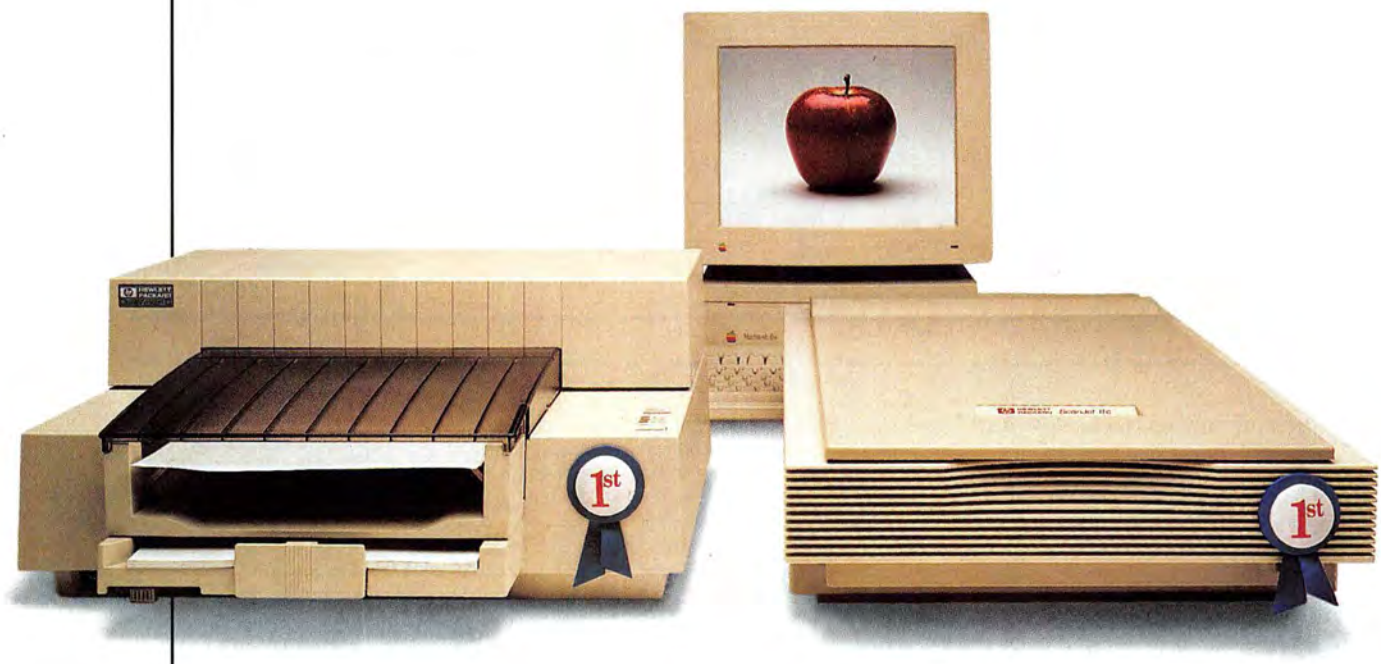
— Katherine Barnes



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## HP wins first-place awards for Mac-compatible products.




*Macworld, August 1992 ©1992 Hewlett-Packard Company PE12212

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HEWLETT PACKARD

brightness (black and white). Not surprisingly, the monitors that fared best with the Superspot 100 in this test — the Nanao Flexscan T560i (a Trinitron) and the RasterOps Sweet 16 (a shadow mask) — also appeared to human eyes to have the best overall image.

*Misconvergence,* or the misalignment of a CRT's electron guns, can also reduce picture sharpness. If the colors used to create an image — red, blue, and green in the case of a color monitor — are misaligned, the whole picture seems fuzzy, like the hideous results frequently seen in color images in newspapers. When we measured misconvergence with our Superspot 100, we found that all the monitors we tested for this report had excellent convergence.

A sharp monitor can still look bad if it suffers from *geometric distortion,* in which shapes are not accurately represented on-screen. In our *pincushion,* or distortion, tests, we used our Superspot 100 to measure how far from straight a straight line was at the edge of the screen (where geometric distortion is the worst). More than 3 pixels of pincushion distortion is noticeable. Only the SuperMac SuperMatch 17 and the Taxan Multivision 875+ showed more than 3 pixels of pincushion distortion, and only just. Remember, most of the monitors in this report have controls that can eliminate pincushion distortion.

### In Living Color

Aside from image sharpness, monitors stand out from one another in their range of colors, brightness, and

**Figure 2: Image Is Everything**

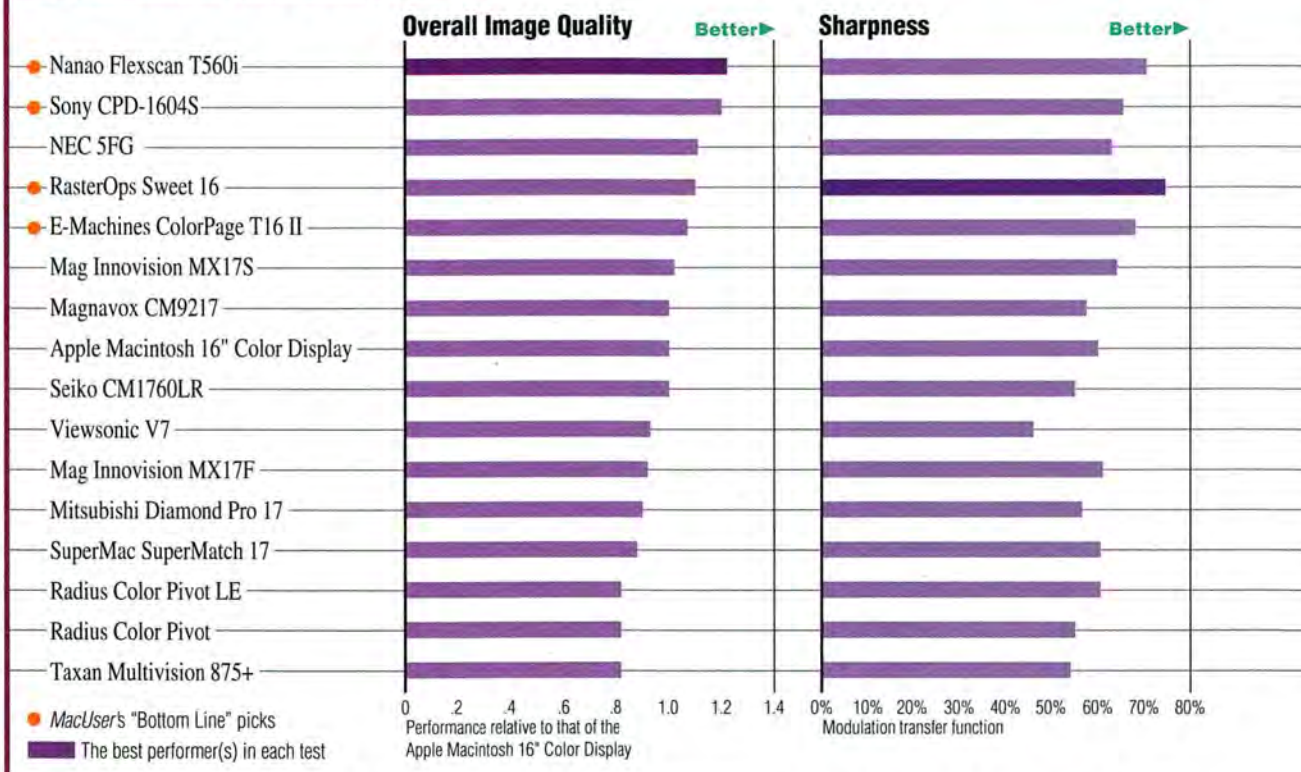



**Figure 2:** We used a Microvision Superspot 100 System and a Minolta Color Analyzer CA-100 to carefully evaluate the image quality of each of the 16-inch monitors. We found them all to perform well — not a lemon in the bunch. Because of the precision of our measurements, the test results exaggerate the differences we found. To the eyes of most users, the differences between the best and the worst monitors are barely perceptible.

**Overall Image Quality:**

To find each monitor's overall image quality, we averaged the results of our individual tests for each monitor and then compared them with the averaged results of the Apple 16" Macintosh Color Display. Although all the monitors produced acceptable images, the Sony CPD-1604S and the Nanao Flexscan T560i led the pack, with the sharpest, most accurate, and brightest images.

**Sharpness:**

The Microvision Superspot 100 System measured focus by finding each monitor's *MTF* (modulation transfer function), an objective measurement of image precision. We measured horizontal and vertical MTF separately and averaged the results. The RasterOps Sweet 16 proved the sharpest, although even the lowest-scoring five monitors (the Mitsubishi Diamond Pro 17, Radius Color Pivot, Seiko CM1760LR, Taxan Multivision

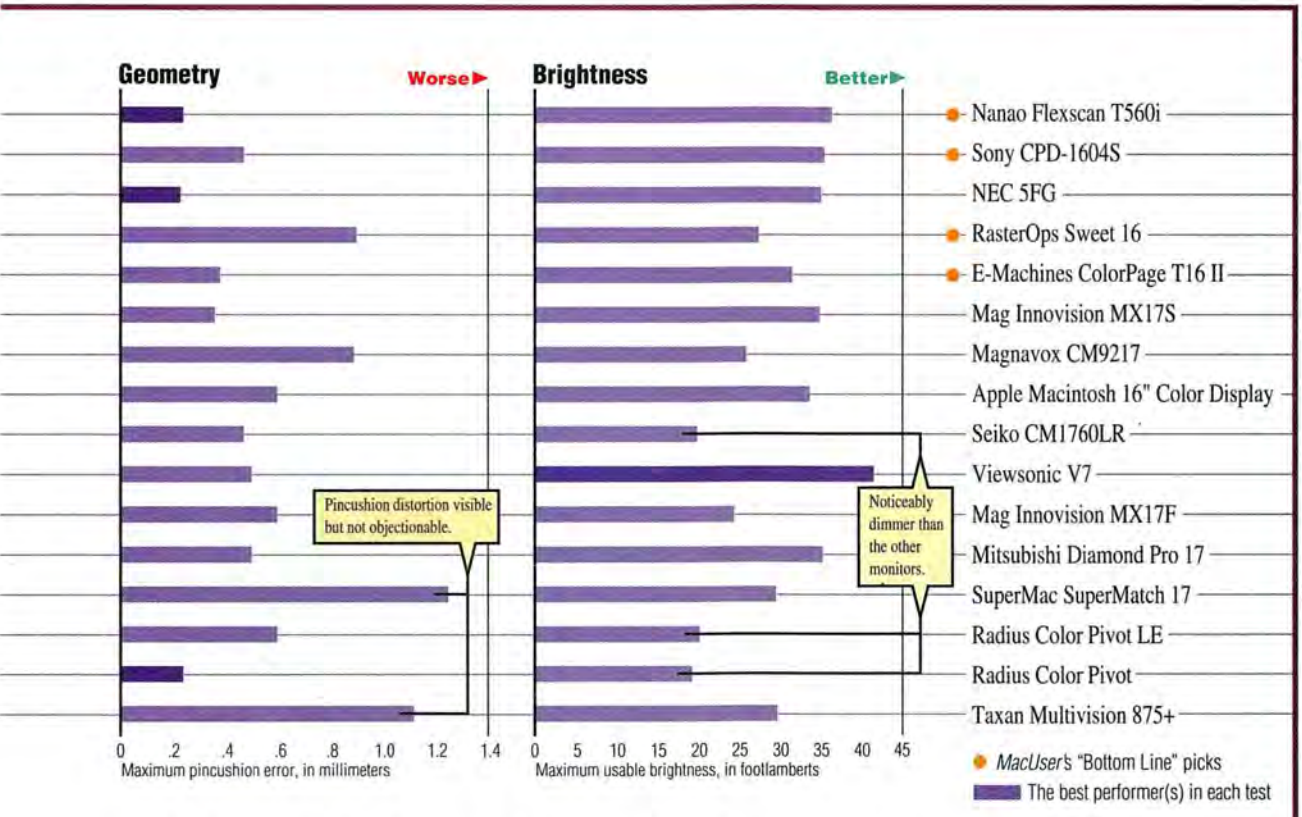
uniformity of screen illumination. We used a Minolta Color Analyzer CA-100 to take a closer look at the monitors' color characteristics.

The widest range of colors — as plotted on a *CIE* chromaticity chart (a widely accepted means of describing colors, established by the Commission Internationale d'Eclairage) — was produced by the RasterOps Sweet 16, thanks to a new phosphor blend in its CRT that delivers particularly bright reds. Only two of the monitors — the Radius Color Pivot and the SuperMac SuperMatch 17 — produced a CIE area index of less than .1. Over our years of testing color display systems, our expert juries have been able to notice a lack of color range only in monitors with CIE area indexes of less than .1.

Another measure of a monitor's color accuracy is to test its *color tracking*, a measure of the intensity of each of a monitor's three primary colors (red, blue, and green) at different brightness levels. If any of the amplifiers that control the power of the guns in the tube for each color is more powerful than the others, the monitor's ability to represent colors accurately on-screen is diminished.

Even the worst of these monitors did very well. Only two fell distinctly below the pack, and they were easy to spot subjectively: At high brightness levels, the screen of the Magnavox CM9217 turned an objectionable blue, and the RasterOps Sweet 16's screen turned slightly yellow as brightness increased.

The monitors' *maximum usable*




875+, and Viewsonic V7) were not so fuzzy as to be unusable.

**Geometry:**

To find the quality of each monitor's *geometry* — its ability to keep straight lines straight — we used the Microvision Superspot 100 System to check for *pincushioning* — how far a line of pixels strays from perfectly vertical or perfectly horizontal. The precision of the measurements exaggerates the narrow range we found — from less than 1 pixel (.35 millimeter) of pincushioning to a bit more than 3 pixels. We judged more than 3 pixels to be just noticeable, possibly a nuisance. Only the Taxan and the SuperMac monitors displayed this level of pincushioning.

**Brightness:**

The Minolta Color Analyzer CA-100 measured how bright each monitor could be while still keeping its best focus. The Viewsonic V7 proved to be the most suitable for brightly lit offices, because it kept focus even when adjusted to be quite bright.

**Not Charted:**

We also used the Superspot and the Color Analyzer to check the gray linearity, color tracking, system gamma, spatial uniformity, color temperature, misconvergence, and time variance of each monitor. All the results fell within a narrow range, and no monitor scored so well or so poorly as to stand out.

*brightness* — the greatest brightness at which a monitor can operate before it loses focus — varied over a range of more than 2:1. The Viewsonic V7 was distinctly brighter than the rest. If your office is brightly lit, by either sunlight or fluorescent lights, choose a monitor with a high maximum usable brightness.

We also checked contrast by measuring the *gamma* of each monitor at its manufacturer's default settings. Gamma mathematically describes the relationship between the signal input to the monitor and the corresponding output and is analogous to the contrast control on a TV. A low gamma, close to 1.0, is ideal for desktop publishing; a high gamma, close to 2.0, is ideal for normal use. Although you can adjust gamma levels simply by adjusting the contrast control, one monitor, the SuperMac SuperMatch 17, had a very high gamma that was bothersome to adjust, because of the side-mounted location of its knobs.

### Talking About Knobs

Like the SuperMatch 17, many of the other monitors could stand some improvement when it comes to ergonomics. We took a close look at how each monitor gives you control over the screen.

In general, the single-resolution monitors offer only brightness and contrast knobs, which makes life simple. But the autosyncs, because they accept many video standards, often need more-extensive adjustment. Side- or rear-mounted controls on an autosync monitor such as the E-Machines ColorPage T16 II, the Mag Innovision MX17S, and the Sony CPD-1604S make the often-difficult job of adjusting such a monitor even harder. The remaining monitors offered excellent control, although some are guilty of a little overkill (see the "Under Control" sidebar).

### Stand by Your Monitor

How much a company is willing to stand behind its product is important, especially when that product costs more than $1,000. Unfortunately, all but two of the monitors in this report come with only a one-year parts-and-labor warranty. RasterOps is to be congratulated for offering three-year coverage and Taxan for its two-year standard warranty.

As for the servicing of these monitors, half the manufacturers require you to deal directly with them and the other half ask you to go through your dealer. Each method has advantages. Dealing directly with the manufacturer should mean that the person to

## Under Control

The more knobs, the better. That was once a common assumption when buying an electronic device. Well, it's high time we nix that myth.

Ideally, fewer is better. After all, control adjustments compensate for things that aren't right — the wrong location or shape of the on-screen image, for example. On an ideal monitor, all you would need would be brightness and contrast controls, necessary for dealing with the vagaries of ambient lighting.

If all you want to do is run your monitor at 832 x 624 pixels (the Mac's 16-inch standard), the minimal pair of controls — contrast and brightness — on the Radius and RasterOps monitors are both sufficient and simple.

Currently, autosync monitors need and have more controls, but as these monitors get smarter, they'll need fewer. Most of the monitors we tested for this report can automatically adjust to handle almost any video signal sent to them. The problem is that they usually can't automatically adjust for the timing of the signals (which affects image position and size).

To deal with this, autosync monitors include controls for adjusting the horizontal position (sometimes called *phase*) and the size (or *width*) of the on-screen image as well as its vertical size (*height*) and position. Properly used, these controls allow you to fill the screen with your Mac desktop, center it, and ensure that it has the correct *aspect ratio* — that is, adjust it so that squares appear truly square.

These controls can be analog or digital. Analog controls (such as those of the Apple, Seiko, and Sony monitors) are typically knobs or shafts you twist to adjust the image. Digital controls are push buttons, although the Nanao Flexscan T560i combines an analoglike thumb wheel with a digital selector.

Digital controls are preferable, because they have no mechanical devices that can wear out. Most all-digital autosyncs can also store control settings, automatically correcting the size and position of the image as they detect a particular set of scanning frequencies. So although the first time you hook up the monitor, you may have to make some adjustments, subsequent changes should be automatic.




**The RasterOps Sweet 16 has just two adjustments, brightness and contrast, but these are adequate for the monitor's purpose — generating the 16-inch display standard, an 832-x-624-pixel image. The Sweet 16 can use preset factory settings for image size and position, because it supports only this resolution.**

## Bargain Color

If you don't own a Quadra and you want to enjoy the benefits of a 16-inch monitor, you'll need a display card to drive the monitor — that's the bad news. The good news is that you don't have to go broke buying one. Here's a quick look at some of the least expensive color-display cards around.

For those who want 24-bit color, Radius offers the PrecisionColor 24XP with built-in QuickDraw acceleration for a low $599 list price. But if 8-bit color is all you need, look at the Spectrum/8 card ($499 list), from SuperMac. If you want to plug a Spectrum/8 in to an LC or IIsi, you'll pay $100 more. Mirror Technology's 8-bit NuBus card and RasterOps' 8XL list for $599 each.

Lapis Technologies is offering two families of 8-, 16-, and 24-bit NuBus display cards — the MatchMaker line (cards that produce one resolution) and the ColorPro line (cards that let you change the resolution through a control panel). Eight-bit MatchMaker cards cost $499 each; ColorPro cards cost $529 each.

Envisio, maker of PowerBook video cards, has announced its first display product for modular Macs. The Quick 16 display card supports 16-bit color on monitors as large as 16 inches for the LC II and has a $595 list price.

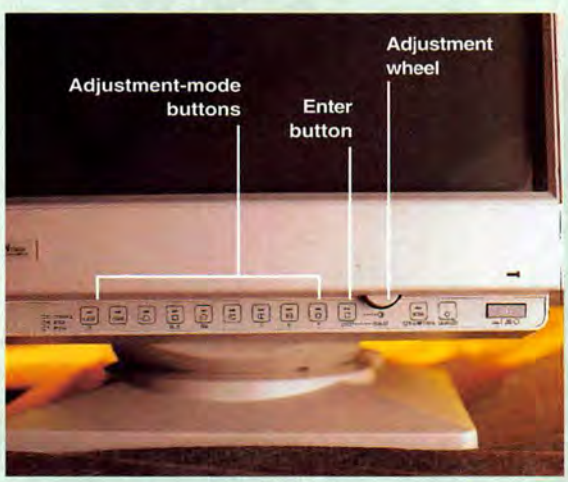


**The 16-bit Lapis ColorPro 8•16**

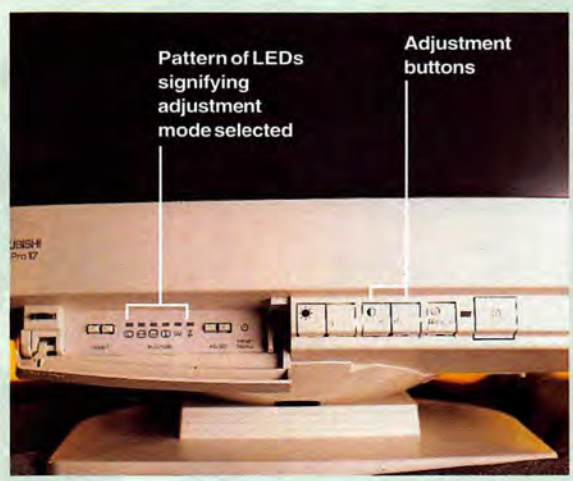
whom you send the monitor should know how to fix it better than anyone else. Going through a dealer usually means you don't have to pay for shipping — and mailing a 50-pound monitor is an expensive proposition. Each method has disadvantages too: It can be difficult to get in touch with the right person when calling the manufacturer (often the documentation doesn't provide a technical-support phone number). And often your dealer can't fix your monitor and ends up shipping it back to the manufacturer anyway.

The bottom line is that monitors are delicate instruments and can be affected by rough handling. So if you believe you can get your best price through mail order, you should make sure you find out how the company plans to ship the monitor and if its repair policy states that it will pay for

Unfortunately, some manufacturers, such as Mitsubishi, go overboard on controls — you shouldn't be required to keep the manual open to decipher what the pattern of lights on the control panel means. Poor positioning of controls is another common failing. The controls on the back of some 16-inch monitors — the E-Machines ColorPage T16 II and the Mag Innovision MX17S, for example — are difficult to reach. Side-mounted controls, such as those on the Apple, Sony, and SuperMac monitors, force you to look away from the screen to see what you're adjusting — literally a pain in the neck.




**The Nanao·Flexscan T560i combines digital control buttons with an analoglike wheel. You select the type of modification you want to make by pushing the button and then make the adjustment with the wheel. This arrangement is the easiest if you need to shift among various standards when using an autosync monitor.**




**Mitsubishi uses digital adjustments for all of its monitor controls. Advanced functions such as varying pincushion and trapezoidal distortion require selecting a mode indicated by a pattern of LEDs (which you must check in the manual). We found this control scheme overly complicated and confusing.**

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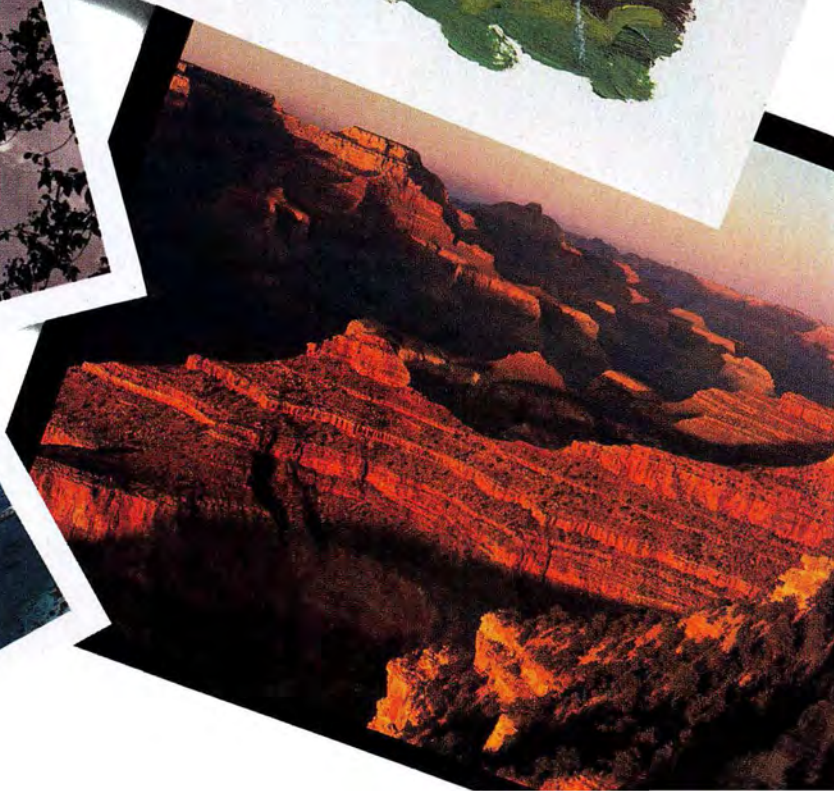












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## The Bottom Line

If your 13-inch AppleColor High-Resolution RGB Monitor is beginning to look a bit small, it's time to move up to the new standard: a 16-inch monitor that offers you 832 x 624 pixels. With 70 percent more pixels, you can leave more applications open and see more of your page-layout, spreadsheet, and word-processing documents.

For those who are looking for a solid 16-inch monitor to plug in to their Mac — and virtually any other computer that will fit on (or next to) a desk — our top choice is the autosynchronous **Sony CPD-1604S** ($1,700 list, $1,105 street). It has one of the brightest and most stable images of all the monitors we tested and offers the best image quality for the money. Its only weaknesses are its lack of Mac cabling and documentation and its side-mounted controls.



**Worth a second look (from left): the Sony CPD-1604S, Nanao Flexscan T560i, RasterOps Sweet 16, and E-Machines ColorPage T16 II.**

The **Nanao Flexscan T560i** ($2,699 list, $2,020 street) is our second choice in autosyncs. It had superior image quality that stood out from all the rest in our tests, even at a casual glance. In addition, the Flexscan T560i combines wide-ranging autosync abilities with the best-thought-out controls of any monitor. On the negative side, this monitor is the priciest of the bunch and it doesn't include Mac cabling or instructions as standard equipment.

If you're looking for a plug-and-play monitor (it has the correct cables to hook straight up to your Mac), you can't do better than the **RasterOps Sweet 16** ($1,499 list, $1,215 street). It edged out the Nanao Flexscan T560i in our sharpness tests and was hampered only by a slight deviation in color tracking (our evaluation monitor had a slightly yellowish screen). Its bright red phosphor gives it the widest color range of any monitor we tested.

The **E-Machines ColorPage T16 II** ($1,699 list, $1,280 street) is our second choice for a plug-and-play monitor.

shipping the monitor back.

In any case, a 16-inch standard monitor shouldn't give you any more problems than a 13-inch standard monitor. Thanks to advances in both Trinitron and shadow-mask technology, each size can give you a crisp, bright, and colorful screen — but a 16-inch standard monitor gives you 70 percent more pixels. Avoiding a 13-inch monitor shouldn't be based on superstition alone. The 13-inch standard was fine for its time, but if you've ever hankered for more screen space — and who hasn't? — and couldn't justify the cost of a 19- or 20-inch monitor, a 16-inch monitor is the way to go. For our favorite picks of this excellent crop, see the "Bottom Line" sidebar.

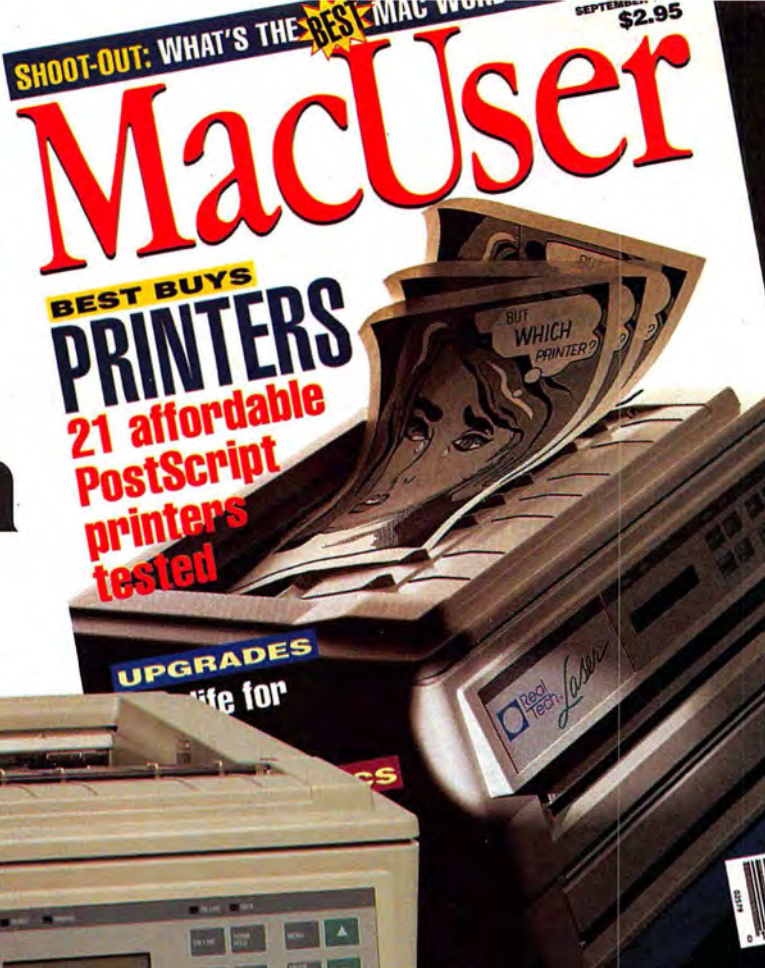
**Winn L. Rosch highly recommends *The Winn Rosch Hardware Handbook* for further information on computer gear.**

## Table 1 Criteria

**List price** — The vendor's retail price for the monitor.
**Street price** — The average price of the monitor through dealers surveyed across the U.S. in September 1992 or through mail order.
**Screen size (diagonal)** — The length, diagonally, of the exposed glass face of the monitor, in inches.
**Active screen size (diagonal)** — The length, diagonally, of the portion of the screen that lights up, in inches.
**Max. pixel dimensions (W x H)** — The maximum number of dots (pixels) that can be displayed on the screen, listed horizontally (width) and vertically (height). All monitors were tested at 832 x 624 pixels.
**Horiz.-scan rate (min., max.)** — The minimum and maximum number of lines of pixels that can be written on the screen per second, in kilohertz.
**Vert.-scan rate (min., max.)** — The minimum and maximum rate at which the screen is redrawn from top to bottom, in cycles per second (hertz).
**Footprint** — The dimensions of the monitor's base given as length times width if the foot is square or as a diameter if the base is circular, in inches.
**Controls** — Does the monitor have controls for adjusting brightness, contrast, position and size of the image, and pincushioning? If yes, the type (analog or digital) and the location of the controls. Also, does the monitor have controls for degaussing, voltage, and power?
**Signal compatibility** — The video standards accepted by each monitor.
**Mac cable/adapter** — Whether a Mac II-series cable or adapter is included.
**FCC certification** — According to the FCC, Class A products should not be sold in the consumer market. To have its product listed as Class B-certified, the vendor provided a verifiable FCC Grant of Certification.

*continues* ►

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CIRCLE 97 ON READER SERVICE CARD.

# 16-Inch Color Monitors

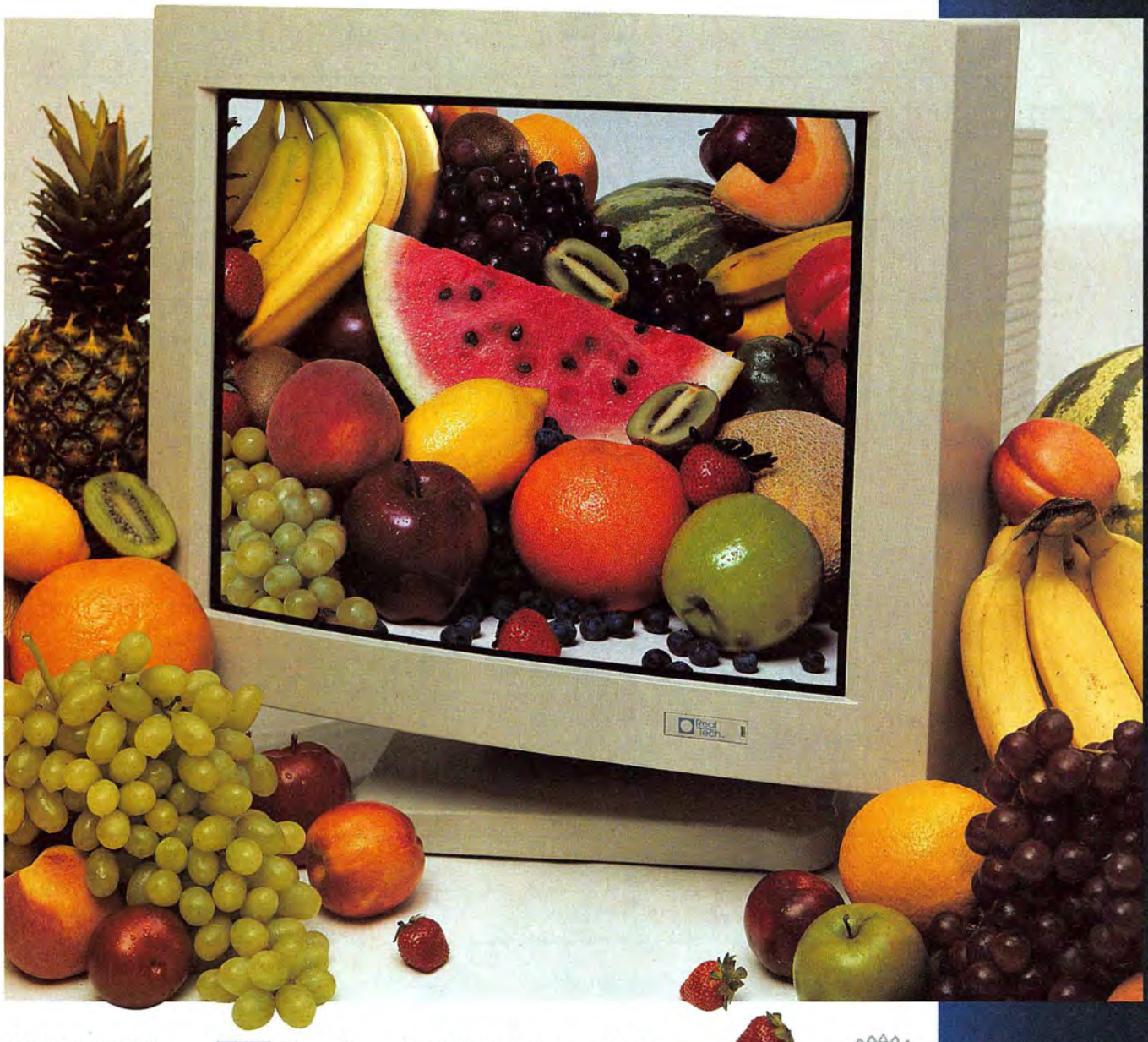
## Table 1: Features of 16-Inch Color Monitors

| ● = yes<br>○ = no | Apple Macintosh<br>16" Color Display<br>★★★★ | E-Machines<br>ColorPage T16 II<br>★★★★ | Mag Innovision<br>MX17F<br>★★★½ | Mag Innovision<br>MX17S<br>★★★½ |
|---|---|---|---|---|
| **List price** | $1,599 | $1,699 | $1,549 | $1,749 |
| **Street price** | $1,225 | $1,280 | $1,320 | $1,580 |
| **Pros** | ADB ports. Good documentation. | Excellent image quality. | | |
| **Cons** | Single resolution. Awkward controls. No tech-support number. | Awkward controls. FCC Class A only. | No cables for Mac included. No tech-support number. | Awkward controls. No cables for Mac included. No tech-support number. |
| **Specifications** | | | | |
| Tube type | Trinitron | Trinitron | shadow mask | Trinitron |
| Screen size (diagonal) | 16 in. | 16 in. | 15.5 in. | 16 in. |
| Active screen size (diagonal) | 14.8 in. | 15 in. | 15.5 in. | 14.5 in. |
| Max. pixel dimensions (W x H) | 832 x 624 pixels | 1,280 x 1,024 pixels | 1,152 x 870 pixels | 1,280 x 1,024 pixels |
| Horiz.-scan rate (min., max.) | 50, 50 kHz | 30, 68 kHz | 30, 68 kHz | 30, 68 kHz |
| Vert.-scan rate (min., max.) | 75, 75 Hz | 50, 120 Hz | 50, 120 Hz | 50, 120 Hz |
| Power consumption | 130 watts | 130 watts | 130 watts | 130 watts |
| Swivel stand | ● | ● | ● | ● |
| Footprint | 11 in. diameter | 12 in. diameter | 11.5 in. diameter | 11.75 in. diameter |
| Monitor depth | 16 in. | 18.5 in. | 19.7 in. | 18.5 in. |
| Monitor weight | 50 lb | 54.9 lb | 50.6 lb | 50.6 lb |
| **Controls** | | | | |
| Brightness/contrast | analog/front | analog/front | analog/front | analog/front |
| Vert./horiz. position | analog/left side | digital/front under panel | digital/front under panel | digital/front under panel |
| Vert./horiz. size | analog/left side | digital/front under panel | digital/front under panel | digital/front under panel |
| Vert./horiz. convergence | ○ | analog/back | ○ | analog/back |
| Pincushioning | ○ | analog/back | ○ | analog/back |
| Degaussing | auto | ● | ● | ● |
| Input select | ○ | ● | ● | ● |
| 120/240-volt switch | auto | auto | auto | auto |
| **Signal compatibility** | | | | |
| Mac 12-inch | ○ | ○ | ○ | ○ |
| Mac 13-inch | ○ | ● | ● | ● |
| Mac 16-inch | ● | ● | ● | ● |
| **Other** | | | | |
| Mac cable/adapter | cable | cable | neither (optional) | neither (optional) |
| Service site | dealer | dealer | direct | direct |
| Manufacturer's warranty | 1 year | 1 year | 1 year* | 1 year* |
| Money-back guarantee | ○ | ○ | ○ | ○ |
| FCC certification | Class B | Class A | Class B | Class B |
| **Company** | Apple Computer, Inc.<br>20525 Mariani Ave.<br>Cupertino, CA 95014<br>800-538-9696<br>408-996-1010 | E-Machines, Inc.<br>9305 S.W. Gemini Dr.<br>Beaverton, OR 97005<br>800-344-7274<br>503-646-6699 | Mag Innovision<br>4392 Corporate Center Dr.<br>Los Alamitos, CA 90720<br>800-827-3998<br>714-827-3998 | Mag Innovision<br>4392 Corporate Center Dr.<br>Los Alamitos, CA 90720<br>800-827-3998<br>714-827-3998 |

*Two-year warranty for the CRT.

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| *Scan 800 Color Scanner* | *$1,199.* |
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CIRCLE 95 ON READER SERVICE CARD.

## Table 1: Features of 16-Inch Color Monitors, continued

| ● = yes<br>○ = no | Magnavox<br>CM9217<br>$$$$ | Mitsubishi<br>Diamond Pro 17<br>$$$½ | Nanao<br>Flexscan T560i<br>$$$$ | NEC<br>5FG<br>$$$$ |
|---|---|---|---|---|
| **List price** | $1,995 | $1,599 | $2,699 | $1,699 |
| **Street price** | $995 | $1,210 | $2,020 | $1,365 |
| **Pros** | Inexpensive. | Toll-free tech-support number. | Excellent image quality. Easy-to-use controls. | Excellent image quality. Excellent documentation. |
| **Cons** | Awkward controls. No tech-support number. | Awkward controls. No cables for Mac included. FCC Class A only. | Most expensive. FCC Class A only. No tech-support number. | No antiglare included. FCC Class A only. |
| **Specifications** | | | | |
| Tube type | shadow mask | shadow mask | Trinitron | shadow mask |
| Screen size (diagonal) | 15.5 in. | 16 in. | 16.25 in. | 15.5 in. |
| Active screen size (diagonal) | 15.5 in. | 15.5 in. | 15.5 in. | 14.75 in. |
| Max. pixel dimensions (W x H) | 1,024 x 768 pixels | 1,280 x 1,024 pixels | 1,280 x 1,024 pixels | 1,280 x 1,024 pixels |
| Horiz.-scan rate (min., max.) | 30, 57 kHz | 30, 64 kHz | 30, 80 kHz | 27, 79 kHz |
| Vert.-scan rate (min., max.) | 50, 100 Hz | 50, 130 Hz | 55, 90 Hz | 55, 90 Hz |
| Power consumption | 120 watts | 130 watts | 148 watts | 190 watts |
| Swivel stand | ● | ● | ● | ● |
| Footprint | 9.5 x 9.5 in. | 10.25 x 10 in. | 11 x 11 in. | 11 in. diameter |
| Monitor depth | 17.3 in. | 17.3 in. | 18.6 in. | 19.8 in. |
| Monitor weight | 46.2 lb | 47.4 lb | 57.5 lb | 56.1 lb |
| **Controls** | | | | |
| Brightness/contrast | analog/front | digital/front | digital/front | analog/front |
| Vert./horiz. position | digital/front | digital/front under panel | digital/front | digital/front under panel |
| Vert./horiz. size | digital/front | digital/front under panel | digital/front | digital/front under panel |
| Vert./horiz. convergence | ○ | digital/front under panel | digital/front | ○ |
| Pincushioning | digital/front | digital/front under panel | digital/front | digital/front under panel |
| Degaussing | ● | ● | ● | ● |
| Input select | ● | ○ | ● | ● |
| 120/240-volt switch | ○ | auto | ○ | ○ |
| **Signal compatibility** | | | | |
| Mac 12-inch | ○ | ○ | ○ | ○ |
| Mac 13-inch | ● | ● | ● | ● |
| Mac 16-inch | ● | ● | ● | ● |
| **Other** | | | | |
| Mac cable/adapter | adapter | neither (optional) | neither (optional) | adapter |
| Service site | direct | direct | direct | direct/dealer |
| Manufacturer's warranty | 1 year | 1 year | 1 year | 1 year* |
| Money-back guarantee | ○ | ○ | ○ | ○ |
| FCC certification | Class B | Class A | Class A | Class A |
| **Company** | Philips Electronics<br>P.O. Box 14180<br>Knoxville, TN 37914<br>800-835-3506<br>310-217-1300 | Mitsubishi Electronics<br>5665 Plaza Dr.<br>P.O. Box 6007<br>Cypress, CA 90630<br>800-843-2515<br>714-220-2500 | Nanao Corp.<br>23535 Telo Ave.<br>Torrance, CA 90505<br>800-325-5202<br>310-325-5202 | NEC<br>1255 Michael Dr.<br>Wood Dale, IL 60191<br>800-388-8888<br>708-860-9500 |

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| *17" Multi-mode Monitor* | *$995.* |
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| *15" Grayscale Monitor* | *$449.* |
| *Color 350 Color Printer* | *$5995.* |
| *Laser Printer* | *$1595.* |
| *Laser 400 Printer* | *$3195.* |

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CIRCLE 94 ON READER SERVICE CARD.

## Table 1: Features of 16-Inch Color Monitors, continued

| ● = yes<br>○ = no | Radius<br>Color Pivot<br>$$$ | Radius<br>Color Pivot LE<br>$$$ | RasterOps<br>Sweet 16<br>$$$$½ | Seiko<br>CM1760LR<br>$$$$ |
|---|---|---|---|---|
| **List price** | $1,549 | $999 | $1,499 | $1,599 |
| **Street price** | $1,260 | $840 | $1,215 | $1,295 |
| **Pros** | Very good documentation. Pivots to portrait view. | Very good documentation. Pivots to portrait view. | Excellent image quality. Simple controls. Three-year warranty. | |
| **Cons** | Imperfect image quality. | Imperfect image quality. | Single resolution. FCC Class A only. | FCC Class A only. |
| **Specifications** | | | | |
| Tube type | shadow mask | shadow mask | shadow mask | Trinitron |
| Screen size (diagonal) | 15 in. | 15 in. | 16.75 in. | 16 in. |
| Active screen size (diagonal) | 13.75 in. | 13.75 in. | 14.5 in. | 14.75 in. |
| Max. pixel dimensions (W x H) | 870 x 640 pixels | 832 x 624 pixels | 832 x 624 pixels | 1,280 x 1,024 pixels |
| Horiz.-scan rate (min., max.) | 68.9, 68.9 kHz | 48, 48 kHz | 49.7, 49.7 kHz | 31, 64 kHz |
| Vert.-scan rate (min., max.) | 75, 85.2 Hz | 72, 72 Hz | 75, 75 Hz | 50, 90 Hz |
| Power consumption | 100 watts | 100 watts | 100 watts | 150 watts |
| Swivel stand | ● | ● | ● | ● |
| Footprint | 11.25 x 13.75 in. | 11.25 x 13.75 in. | 10 x 10 in. | 11 x 11.5 in. |
| Monitor depth | 17 in. | 17 in. | 17.4 in. | 17.5 in. |
| Monitor weight | 47.9 lb | 47.9 lb | 35 lb | 51 lb |
| **Controls** | | | | |
| Brightness/contrast | analog/top | analog/top | analog/front | analog/front |
| Vert./horiz. position | ○ | ○ | ○ | analog/front |
| Vert./horiz. size | ○ | ○ | ○ | analog/front |
| Vert./horiz. convergence | ○ | ○ | ○ | ○ |
| Pincushioning | ○ | ○ | ○ | ○ |
| Degaussing | auto | auto | ● | ○ |
| Input select | ● | ○ | ○ | ○ |
| 120/240-volt switch | auto | auto | auto | ○ |
| **Signal compatibility** | | | | |
| Mac 12-inch | ○ | ○ | ○ | ○ |
| Mac 13-inch | ○ | ○ | ○ | ● |
| Mac 16-inch | ● | ● | ● | ● |
| **Other** | | | | |
| Mac cable/adapter | cable | cable | cable | cable |
| Service site | dealer | dealer | dealer | direct |
| Manufacturer's warranty | 1 year | 1 year | 3 years | 1 year |
| Money-back guarantee | ○ | ○ | ○ | ○ |
| FCC certification | Class B | Class B | Class A | Class A |
| **Company** | Radius, Inc.<br>1710 Fortune Dr.<br>San Jose, CA 95131<br>800-227-2795<br>408-434-1010 | Radius, Inc.<br>1710 Fortune Dr.<br>San Jose, CA 95131<br>800-227-2795<br>408-434-1010 | RasterOps Corp.<br>2500 Walsh Ave.<br>Santa Clara, CA 95051<br>800-729-2656<br>408-562-4200 | Seiko Instruments<br>1130 Ringwood Ct.<br>San Jose, CA 95131<br>800-888-0817<br>408-922-5800 |

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— MACWORLD MAGAZINE
September 1992

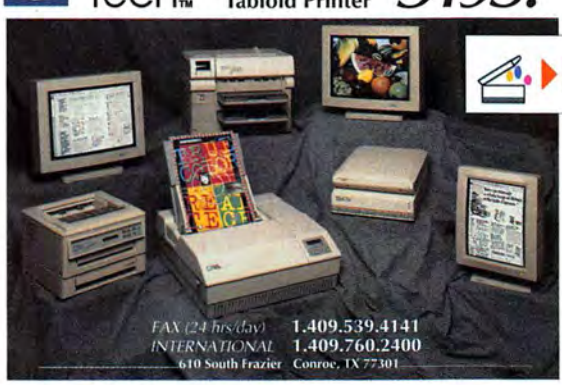
*Jeanne is thrilled that she doesn't have to fiddle around and tape pages together anymore. No more tiling! No more cut-and-taped mockups!*

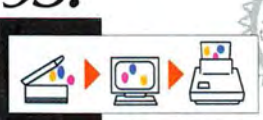
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- ATM font rendering technology
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***"...be forewarned:** PostScript-clone printers still have a long way to go before they can rival true Adobe PostScript printers."*

Quote from MacUser September 1992 issue. "Personal PostScript Printers" by Bruce Fraser.

*For more information, call toll-free:*

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CIRCLE 96 ON READER SERVICE CARD.

## Table 1: Features of 16-Inch Color Monitors, continued

| ● = yes<br>○ = no | Sony<br>CPD-1604S<br>★★★★½ | SuperMac<br>SuperMatch 17<br>★★★½ | Taxan<br>Multivision 875+<br>★★★ | Viewsonic<br>V7<br>★★★½ |
|---|---|---|---|---|
| **List price** | $1,700 | $1,399 | $1,899 | $1,399 |
| **Street price** | $1,105 | $1,000 | $1,300 | $1,200 |
| **Pros** | Excellent image. | Inexpensive. Good documentation. | Two-year warranty. | |
| **Cons** | Awkward controls. No cables for Mac included. No tech-support number. | Awkward controls. FCC Class A only. | Expensive. Imperfect image quality. No cables for Mac included. | No cables for Mac included. No tech-support number. |
| **Specifications** | | | | |
| Tube type | Trinitron | shadow mask | shadow mask | shadow mask |
| Screen size (diagonal) | 16.5 in. | 16 in. | 15.75 in. | 16 in. |
| Active screen size (diagonal) | 15 in. | 14.7 in. | 14.8 in. | 14.75 in. |
| Max. pixel dimensions (W x H) | 1,024 x 768 pixels | 1,024 x 768 pixels | 1,280 x 1,024 pixels | 1,280 x 1,024 pixels |
| Horiz.-scan rate (min., max.) | 28, 57 kHz | 30, 75.23 kHz | 30, 75 kHz | 31, 60 kHz |
| Vert.-scan rate (min., max.) | 50, 87 Hz | 56, 75 Hz | 50, 90 Hz | 50, 90 Hz |
| Power consumption | 120 watts | 150 watts | 140 watts | 130 watts |
| Swivel stand | ● | ● | ● | ● |
| Footprint | 11.75 x 11.75 in. | 10 x 10 in. | 9.75 x 9.75 in. | 10 x 10 in. |
| Monitor depth | 17.2 in. | 17.2 in. | 17 in. | 18.9 in. |
| Monitor weight | 44 lb | 49.5 lb | 55 lb | 42.8 lb |
| **Controls** | | | | |
| Brightness/contrast | analog/front | analog/right side | analog/right side | digital/front |
| Vert./horiz. position | analog/left side | digital/right side | digital/right side | digital/front under panel |
| Vert./horiz. size | analog/left side | digital/right side | digital/right side | digital/front under panel |
| Vert./horiz. convergence | ○ | ○ | ○ | ○ |
| Pincushioning | ○ | digital/right side | digital/right side | ○ |
| Degaussing | auto | auto | auto | auto |
| Input select | ● | ○ | ○ | ○ |
| 120/240-volt switch | auto | auto | auto | auto |
| **Signal compatibility** | | | | |
| Mac 12-inch | ○ | ○ | ○ | ○ |
| Mac 13-inch | ● | ● | ● | ● |
| Mac 16-inch | ● | ● | ● | ● |
| **Other** | | | | |
| Mac cable/adapter | neither (optional) | adapter | neither (optional) | neither (optional) |
| Service site | direct | dealer | direct | dealer |
| Manufacturer's warranty | 1 year* | 1 year | 2 years | 1 year |
| Money-back guarantee | ○ | ○ | ○ | ○ |
| FCC certification | Class B | Class A | Class B | Class B |
| **Company** | Sony Corp. of America<br>655 River Oaks Pkwy.<br>San Jose, CA 95134<br>800-352-7669<br>408-432-0190 | SuperMac Technology<br>485 Potrero Ave.<br>Sunnyvale, CA 94086<br>408-245-2202 | Taxan America, Inc.<br>161 Nortech Pkwy.<br>San Jose, CA 95134<br>800-648-2926<br>408-946-3400 | Viewsonic<br>20480 E. Business Pkwy.<br>Walnut, CA 91789<br>800-888-8583<br>714-869-7976 |

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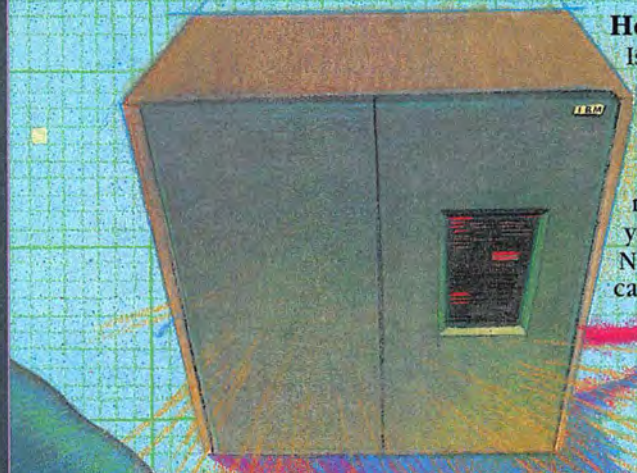
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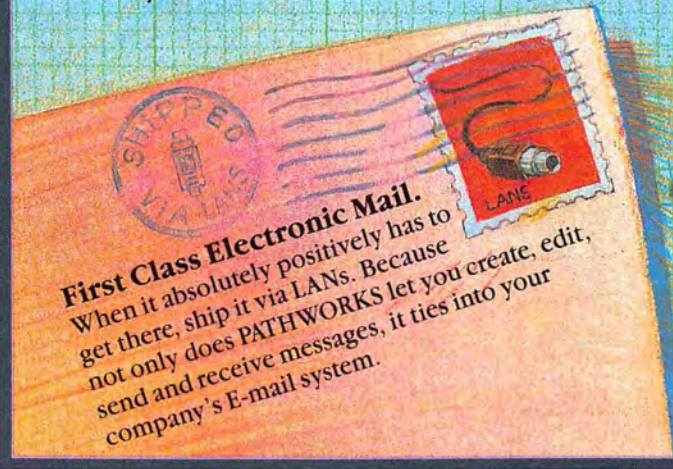


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# Network Renderers:

## Drawing On All Resources

*Just because you need to sleep doesn't mean your Macs do. MacUser Labs tests three rendering packages that make networked Macs productive 24 hours a day.*

**BY STEFAN B. LIPSON AND SEAN SAFREED**

A rendering application puts the creative potential of a photo studio inside your Mac. Just as a photographer manipulates lighting to enhance a photo, a rendering application lets you add the subtleties of light and shadow to 3-D images created on your Mac. Exceptionally lifelike images can be created, but the processing power — and time — required to produce them is equally exceptional.

For experienced Mac designers, rendering has become synonymous with excruciatingly long waits. Even a Silicon Graphics Indigo — a workstation specifically designed for such computationally intensive graphical tasks — can take many hours to render a single image. A CPU accelerator or a faster Mac can help, but don't expect even a Quadra 950 to single-handedly free you from the drudgery of rendering. It won't, and it can't.

But imagine a world in which a rendering job could be parceled out to a collection of Macs, all working simultaneously to render the same image in a fraction of the time it takes a solitary machine to do so. Although this technology — dubbed *distributed rendering* or *network rendering* — has long existed in the UNIX-workstation world, artists have been anxiously awaiting its arrival in the Mac world. Now the wait is over: Mac-based distributed rendering has arrived.

PHOTOGRAPHY: STEVEN UNDERWOOD NETWORK-RENDERED ILLUSTRATION: SEAN SAFREED


Macintosh
Quadra 700

# Network Rendering Software

To find the best cure for your rendering headaches, MacUser Labs tested three new products that offer the power of network rendering for the Mac: Specular's BackBurner 1.0, Ray Dream's DreamNet 1.02, and Strata's RenderPro 1.01 let you dedicate multiple networked Macs to the task of rendering a single image.

To evaluate these products, we compared their performance on several challenging benchmark tests in the MacUser Labs NetWorkShop testing lab. We also looked at each product's documentation, features, and capabilities and found that not all network rendering programs are created equal.

## Labor-Intensive

A renderer is a computer-age paint-by-number system that takes an image containing geometric models — typically created with a 3-D-CAD or 3-D-solid-modeling package — and adds color, shading, and texture on a pixel-by-pixel basis. The rendering process is computationally intensive; to accurately complete an image, a renderer must typically calculate the visual characteristics of many compositional elements. Ray tracing — a particularly involved method of rendering — traces a single ray of light through the scene, calculating reflectivity, intensity, and absorption with respect to viewer, light, and object position as well as evaluating the physical characteristics and color attributes of each object.

Before rendering, an image is typically designed with software that offers solid-modeling capabilities. Once the objects have been designed — often as wire-frame replicas — and a scene has been laid out, the image is transferred to a renderer. Many programs offer rendering capabilities, and the better the quality of the rendered image, the longer the rendering time. Only three programs, however, offer *network* rendering on the Mac.

BackBurner, DreamNet, and RenderPro all tackle the distributed rendering task in a similar fashion; one Mac acts as the *host,* or *master,* machine and is charged with overseeing the Macs doing the rendering — known as the *slaves.* The image to be rendered is broken into small pieces and parceled out to the slaves. The slaves render these small blocks, and when each rendered component is finished, it's sent back to the host machine over the network (see the "How to Slash Rendering Times" sidebar).

Your networked Macs can be brought into the rendering fold in two ways: First, the master can detect an idle Mac on the network and enlist it in full-time slave duty in the rendering process. Second, a slave can help render an image in the background, donating free CPU cycles even as you work in your spreadsheet or word-processing program.



**Many programs offer rendering capabilities. Only three programs, however, presently let you dedicate multiple networked Macs to the task of rendering a single image.**

## Installation

To harness the unused power of your network, you need to purchase a network rendering module for each Mac you plan to designate as a slave. Installing DreamNet's network rendering module is simple: At each node, click on the installer, and in minutes, the job is done, its completion marked by a dialog box that prompts you to enter the product's serial number. BackBurner's installation is almost as easy: Just copy the BackBurner control-panel device into each slave's System Folder, and enter the product serial number the first time you run the program on each Mac. RenderPro's installation, on the other hand, is unnecessarily frustrating. Although RenderPro uses an installer, you must subsequently perform a series of steps to select, copy, and move files — the very tasks the installer should take care of for you.

Once you've installed all the software, you'll want to create rendering workgroups, establish rendering schedules, and otherwise configure the software for your particular network and rendering needs.

DreamNet is the easiest of the three to configure. On the master Mac, DreamNet's Chooser-like interface displays available slaves in each network zone. To assign slaves to a particular rendering job, just select them with the mouse. DreamNet also conveniently lets you name and save these rendering groups so that you can quickly and easily redefine which Macs will be participating in a given rendering session.

BackBurner and RenderPro each require configuration via the Users & Groups control panel. This little bit of extra work is worthwhile because it allows each slave's user to limit the master's access. In addition, RenderPro lets each slave define a weekly rendering calendar to tell the master at what hours it is available for rendering. BackBurner doesn't provide a calendar, but it does allow each slave to have password protection for preventing unwanted machine access. It's smart too: If several slave machines have been given the same password, BackBurner automatically signs them in as a group.

## Mountains into Molehills

For our testing of the three network renderers, we modeled test images in the native modeler of the respective

## How We Tested

Testing for this report took place in the MacUser Labs NetWorkShop, our multiplatform-network testing facility. Our test network consisted of a Quadra 900 with 20 megabytes of RAM as the master and four Quadra 700s with 8 megabytes of RAM each as the slaves. We connected all the machines via an Ethernet network, using the Quadras' built-in Ethernet capabilities. Our test image was created with each network renderer's native modeler: Specular's Inifini-D for BackBurner, Ray Dream's Ray Dream Designer for DreamNet, and Strata's StrataVision 3d for RenderPro. We first rendered each image on the Quadra 900 alone. We then added one, two, and four Quadra 700s and noted the improvement in performance.

In addition to obtaining raw performance-improvement numbers, we also tested the products to see how they handled or executed background tasks. We first transferred a 5-megabyte file between two of the test Quadra 700s while they were executing a distributed render. We did a find-and-replace operation on an 800K 100-page WriteNow 3.0 document during a render. We loaded Excel 3.0 during a render and recalculated the spreadsheet entries for 10,000 cells. Finally, we crashed the master and slave machines during a group render to determine whether the software could handle recovery and how the master machine accommodated the crash. Each test provided us with different insights into the effectiveness of each program.

We created a background, or *back plane*, in Photoshop 2.01 that incorporated a texture map to make the numbers appear to be floating.

The loop on top of the watch is a *path-extruded* object — a three-dimensional object created by moving a two-dimensional object along a third axis. Infini-D doesn't support path extrusions, so we used a DXF import.

We produced the watch body with the *lathe* function — we created a sliver of the watch and then rotated it to define the full body.

StrataVision 3d let us create the spring as a swept circle — we swept a circle in space and offset the axis of rotation. The other products can't do this, so we had to import the spring as a *DXF object* (DXF is a file format common to all modelers).




We created the *MacUser* logo in Illustrator and then *extruded* it — turned it into a three-dimensional object by extending the two-dimensional letters into three dimensions.

The face of the watch is a *texture map* — an image that creates the illusion of having the physical properties of a substance such as wood or metal — applied to the body.

The ground plane was a *procedural texture* — a mathematically calculated image, as opposed to a bit-mapped image.

**To accurately assess the capabilities of each network renderer, we created a complex image composed of a variety of elements and timed how long it took multiple Macs to render the image.**

packages, as required by each product: We used Ray Dream Designer for DreamNet, Strata's StrataVision 3d for RenderPro, and Specular's Infini-D for BackBurner. All three programs offered startling improvements in rendering speed, and the more Macs we added, the better the results (see Figure 1). To take full advantage of the power of network rendering, we used — and we recommend — fast Macs on an Ethernet network. Ethernet can be crucial, because network transmission and the required communications between rendering stations on LocalTalk can slow you down, depriving you of your distributed gains.

### Speedy Delivery

Specular's BackBurner came closest to delivering ideal speed. (We define *ideal speed* as a simple multiple of Mac processing power, not taking into account the network and distribution overhead necessary for managing the network rendering job.) BackBurner achieves its excellent speed in part by the way it minimizes the amount of data transmitted from the master to its slaves. For example, BackBurner sends a *texture map* — a surface pattern for a 2- or 3-D image component, typically requiring a lot of memory — to a slave only if the slave is processing a segment of the image that actually uses that map; DreamNet and RenderPro send every texture map needed for the complete image to all the slaves, regardless of need. With a test image of moderate complexity, such as the one we used, DreamNet and RenderPro sent an additional 450K of data across the network to each slave machine. This unnecessary traffic slowed down DreamNet — but in spite of the additional network traffic, RenderPro still offered excellent speed, only slightly slower than BackBurner's.



**All three network rendering programs offered startling improvements in rendering speed, and the more Macintoshes we added, the better the results.**

Like any image-manipulation process on the Mac, rendering requires a lot of RAM (particularly when you're rendering 24-bit images), so the more RAM, the better the performance will be. BackBurner offers the most effective use of memory: It requires only 2 megabytes of RAM to run on the master or the slave machine. As a control-panel device, it occupies a minuscule 8K of memory, becoming active only when the slave machine has been inactive for a previously specified period or when Berkeley Systems' After Dark screen saver kicks in.

The other programs occupy far more memory: DreamNet requires 3.58 megabytes to run on the master and a minimum of 3 megabytes to run on a slave. Although memory requirements

## On the Horizon

What could be faster than several Macs collectively rendering parts of the same image and then rushing their contributions over an Ethernet network to a Mac that puts it all together into a finished work of art?

How about multiple Macs inside a single Quadra? That's what you get when you install multiple Radius Rockets — 68040-based accelerators on NuBus cards — running RocketShare, Radius' soon-to-be-released distributed-processing software.

Our preliminary tests show that four Radius Rockets running a beta version of RocketShare inside a Quadra 900 — with all four boards and the Quadra tackling the same rendering job — can easily outpace five Quadra 700s running the same job over an Ethernet network. In fact, our Rocket/Quadra configuration proved to be about 30 percent faster.

Where does all that speed come from? In large part, RocketShare outperforms networked Macintoshes by bypassing network bottlenecks. Although Ethernet's 10-megabit-per-second rate is far speedier than LocalTalk's 230 kilobits per second, the Rocket moves data across the Mac's NuBus, which can theoretically support transfer rates of more than 100 megabits per second (although it delivers about 30 megabits per second in most actual use).

All the network rendering products reviewed in this report can run under RocketShare, and Radius has signed a licensing agreement with Ray Dream to bundle DreamNet software with every Rocket. In addition, Radius is publishing Ray Dream's *API* (application-programming interface), which will allow any software developer to take advantage of distributed processing. Expect to see computational-intensive applications such as mathematical-simulation and color-separation software appear in multiprocessing versions. Radius, 1710 Fortune Drive, San Jose, CA 95131; 408-434-1010.

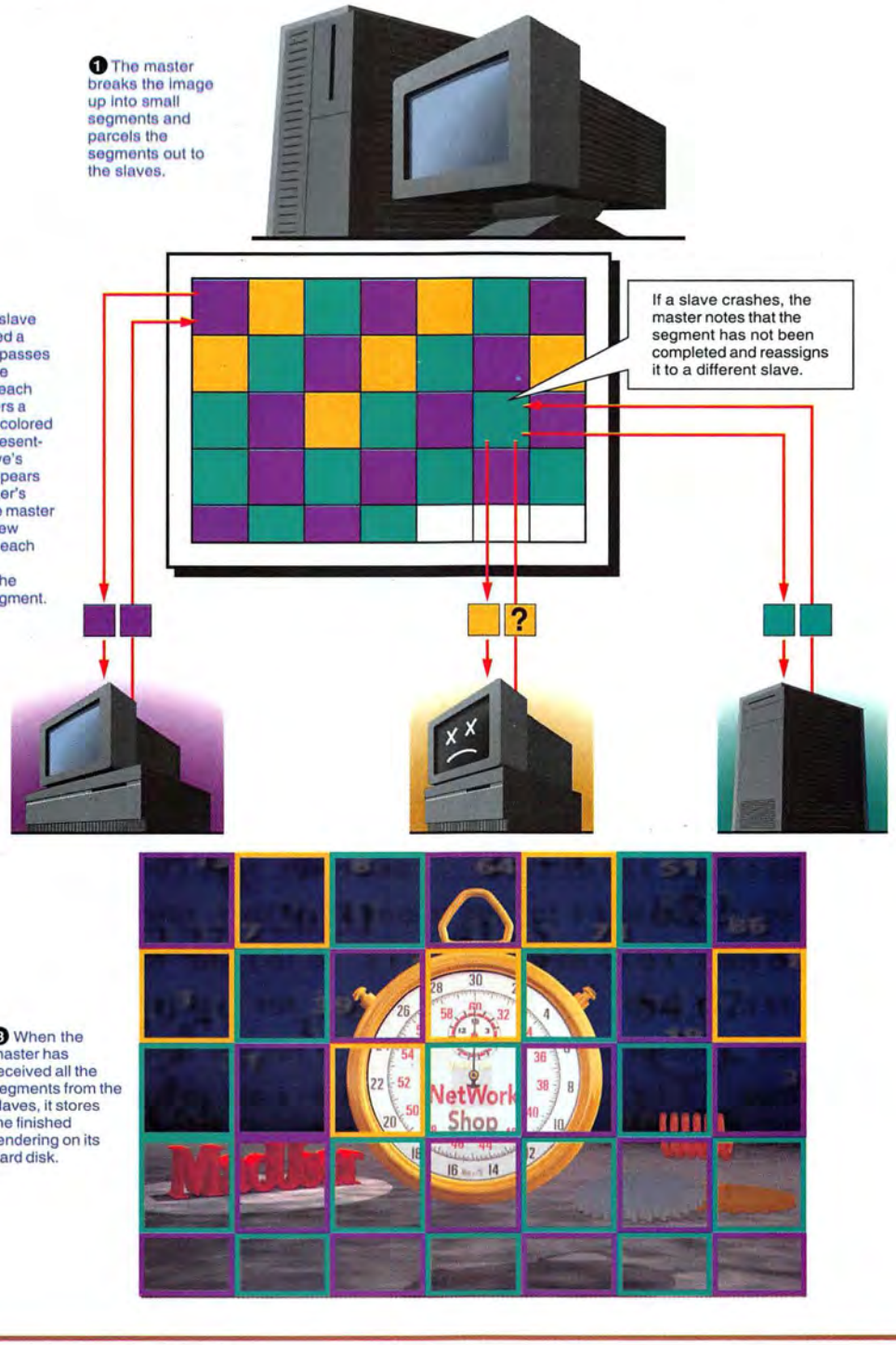
Pixar will soon be announcing NetRenderMan 1.1, its version of a distributed-rendering product. An earlier version, 1.0, used the Mac solely as a front end to UNIX-based machines. Version 1.1 will allow users in a multiplatform environment to distribute the rendering job to a combination of UNIX-based workstations, such as those from NeXT and Silicon Graphics, and Macs. Pixar, 1001 W. Cutting Blvd., Richmond, CA 94804; 510-236-4094.

NetRenderMan also runs on the superfast NuSprint card, from Yarc Systems (*Cray* spelled backward — get it?), which is based on an AMD Am29050 RISC processor and is purported to make a IIfx run 10 to 12 times as fast. But don't rush out and buy one and expect it to speed up your Excel recalculations — this special-purpose card can work only with applications specifically rewritten for its RISC chip. A NuSprint card equipped with 8 megabytes of custom DRAM SIMMs lists for $2,995, a 16-megabyte version lists for $3,995, and a 32-megabyte version is $5,495. Yarc Systems, 975 Business Center Circle, Newbury Park, CA 91320; 800-275-9272 or 805-499-9444.

## How to Slash Rendering Times

It's a designer's dream come true: multiple idle Macs working together to render a single image.

To accomplish this computerized teamwork, a network rendering program such as Specular's BackBurner, Ray Dream's DreamNet, or Strata's RenderPro can take a single image, break the image into small segments, and then distribute the pieces to participating Macs on a network. The Macs work in unison to render a complete image.





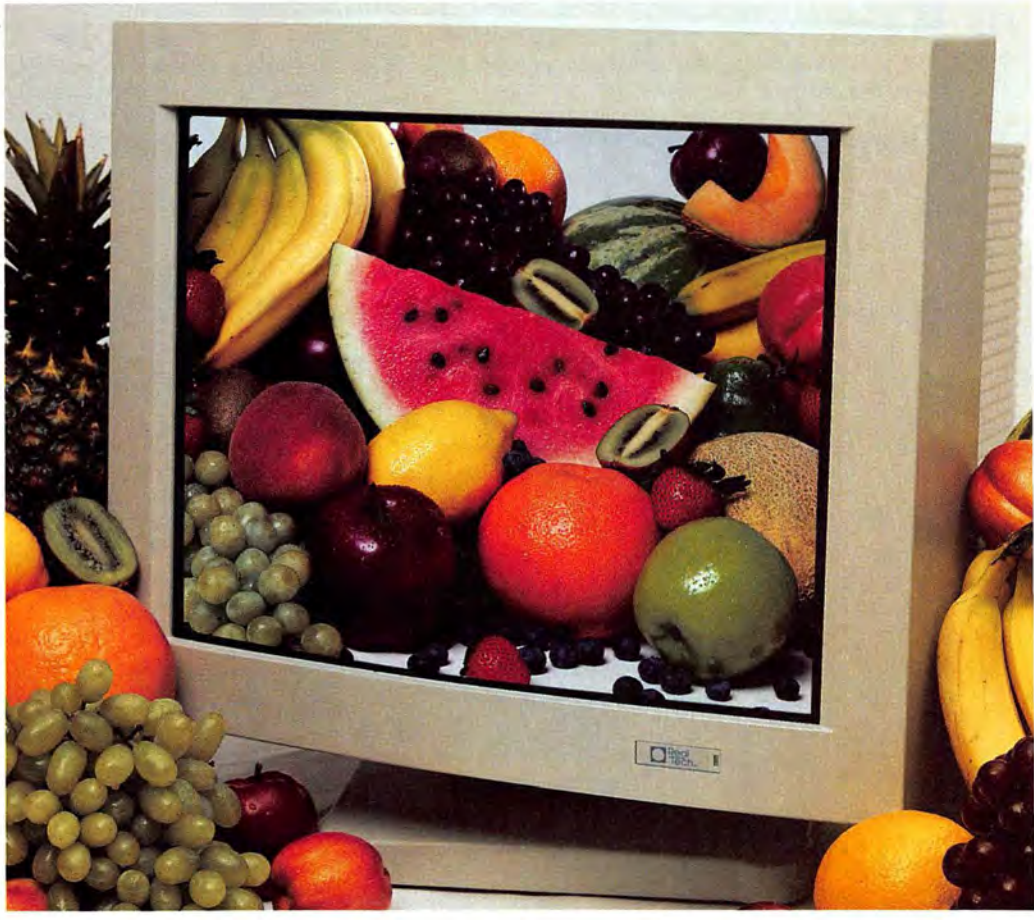
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| J. RasterOps 16" (RasterOps Sweet 16) | 1,249 | Panasonic | | | ■ | | | | ■ | |
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| L. Sony 17" | 1,189 | Trinitron | ■ | | ■ | ■ | | ■ | ■ | ■ |
| M. Seiko 17" (1760) | 1,295 | Trinitron | ■ | | ■ | ■ | | ■ | ■ | |
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| *RealTech 15" Grayscale (shown at left)* | 449 | — | | ■ | | | | | ■ | ■ |
| *Seiko 14" Color 1445 (shown at left)* | 579 | Trinitron | ■ | | | | | | ■ | ■ |
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| **RealTech Laser**<br>**$1,595** ★★★★½<br>*Lease: $44/month*<br>■ 300 dpi<br>■ 9 pages/min.<br>■ 2 Mb RAM (expandable to 10 Mb) | ■ Adobe PostScript Level 2<br>■ Weitek RISC processor | ■ 5,000 pages per month<br>■ Optional 2nd paper tray & cassette feeder are available for $250 (for both)<br>*"Genius level" memory is dynamically allocated and automatically reclaimed.* | ■ SCSI port<br>■ Appletalk RS-422, parallel, and RS-232C. | ■ 35<br>*ATM font rendering technology builds raw type characters 4 to 5 times faster, enabling the RealTech Laser to print complex documents faster than other printers in its price range.* |
| **Texas Instruments MicroLaser XL Turbo**<br>**$2,795**<br>*Lease: $77/month*<br>■ 300 dpi<br>■ 16 pages/min.<br>■ 2.5 Mb RAM (expandable to 10.5 Mb) | ■ Adobe PostScript Level 2<br>■ Weitek RISC processor | ■ 25,000 pages per month<br>■ Optional 2nd paper drawer | ■ Optional SCSI port<br>■ Appletalk RS-422, parallel, and RS-232C | ■ 35 |
| **Texas Instruments MicroLaser Plus**<br>**$1,249**<br>*Lease: $34/month*<br>■ 300 dpi<br>■ 9 pages/min.<br>■ 1.5 Mb RAM (expandable to 4.5 Mb) | ■ Adobe PostScript Level 1<br>■ Motorola 68000 processor | ■ 10,000 pages per month<br>■ Optional 2nd paper drawer and envelope feeder | ■ Optional SCSI port<br>■ Appletalk RS-422, parallel, and RS-232C | ■ 17<br>*Available with 35 resident fonts ($1349)* |
| ***The only 11x17 printer with Adobe PostScript Level 2 for less than $3500.***<br>**RealTech Laser 400**<br>**$3,195**<br>*Lease: $88/mo.*<br>■ Choice of 300 or 400 dpi<br>■ 15 ppm (letter size); 8 ppm (tabloid size)<br>■ 4 Mb RAM (expandable to 16 Mb) | ■ Adobe PostScript Level 2<br>■ Weitek RISC processor (and ATM font rendering technology) | ■ 30,000 pages per month<br>■ Two paper trays included *(one tray for letter size; one tray for tabloid size.)*<br>***"...be forewarned: PostScript-clone printers still have a long way to go before they can rival true Adobe PostScript printers."***<br>Quote from MacUser September 1992 issue. "Personal PostScript Printers" by Bruce Fraser. | ■ SCSI port<br>*Three interface ports: Appletalk RS-422, IBM PC parallel, and RS-232C.*<br>★★★★ *MACWORLD MAGAZINE September 1992* | ■ 35<br>*Jeanne is thrilled that she can print proofs of her company newsletter on tabloid-size paper. No more tiling!* |
| **QMS 860 Hammerhead***<br>**$4,279** *Lease: $117/mo.*<br>■ 600 dpi<br>■ 8 ppm (letter size); 4.6 ppm (tabloid size)<br>■ 12 Mb RAM (expandable to 32) | ■ Adobe PostScript compatible<br>■ Intel 80960CA RISC processor<br>*Three interface ports: Appletalk RS-422, IBM PC parallel, and RS-232C.* | ■ 10,000 pages per month<br>■ Optlonal 2nd paper cassette | ■ SCSI port<br>■ Optional Ethernet<br>■ 39 fonts | |

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|---|---|
| 33 MHz Accelerator | $529 |
| 40 MHz Accelerator | 739 |
| 50 MHz Accelerator | 1065 |
| ComboCache Card for IIsi | 209 |
| PowerMath Card for LC | 109 |
| Equalizer Card for LC | 159 |
| FastCache for Quadra 700, 900 & 950 | 389 |

***PowerCache Adapter***

Provides space on your Mac Classic or SE to install up to 16 Mb of RAM.

PowerCache Adapter ..... $40

## APPLIED ENGINEERING

***Add the power of a Quadra!***

Based on the same (68040) processor as the Quadra.

| | |
|---|---|
| TransWarp SE (40 MHz w/16-FPU) | $959 |
| TransWarp LC (25 MHz) | 459 |
| TransWarp LC (50 MHz) | 1059 |
| TransWarp LC (50 MHz w/50-FPU) | 1319 |
| TransWarp 040 (25 MHz) | 1749 |
| QuickSilver | 189 |
| 1.44 SuperPlus Drive | 279 |
| QuadraLink | 199 |

## FUSION DATA

***TokaMac Accelerators***

TokaMac's 68040 accelerators provide high-speed performance for the Mac IIci, IIsi, and LC. The same processor used in the Quadras can increase performance up to 300% for graphics and multi-media programs...or up to 600% when you're number-crunching!

| | |
|---|---|
| TokaMac IIci | $1409 |
| TokaMac IIsi | 1409 |
| TokaMac LC | 1075 |

## NEWER TECHNOLOGY

***Quadra 700 Overdrive Accelerator***

Increases performance up to 32%.

Quadra 700 Overdrive ..... $259

***Image Magic***

DSP board accelerates Adobe Photoshop filters by 200-964%.

| | |
|---|---|
| Image Magic NuBus | $769 |
| Image Magic FX/PDS | 699 |
| Image Magic Quadra/PDS | 699 |

## PERIPHERAL LAND

***Quick SCSI Accelerator***

A SCSI-2 NuBus host adapter; improves SCSI performance by up to 500%. Partitioning allows a smaller capacity drive to be mirrored into a partition of a larger capacity drive. *SCSI-1 compatible to work with your existing SCSI devices.*

Quick SCSI Accelerator ..... $339

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***Rocket Accelerators***

For the Mac II family. The 25 MHz Rocket 25i is powered by a 68LC040 processor. The 25 MHz Rocket and 33 MHz Rocket 33 are powered by a 68040 processor, which has an integrated math-coprocessor. All include: 8 SIMM slots for up to 128 Mb of DRAM; 040 PDS slot; and QuickDraw and display-list acceleration software.

| | |
|---|---|
| Radius Rocket 25i | $1239 |
| Radius Rocket | 1649 |
| Radius Rocket 33 | 2069 |

## CARDS AND HUBS



### Asanté 10T Hub/8 (Ethernet concentrator)

***Lets you use inexpensive unshielded twisted-pair (UTP) telephone wire instead of expensive coaxial cable for local area networks.***

10Base-T Hub/8 ..... $265

***Asanté EN/SC (SCSI-to-Ethernet adapter).*** For Macs without available slots.

EN/SC ..... $339

***Asanté MacCon 3 Ethernet card.*** Automatically configures to media used.

MacCon 3 Card ..... $216

### TechWorks GraceLAN Update Manager




***The most advanced tool available for updating/installing software on your network.***

GraceLAN for 50 Users ..... $285

***100s more networking products available! (There's not enough room to show them all in this ad.)***



### DaynaPORT E/II-T NuBus Card

***Connects Mac II computers to thick, thin, fiber optic or 10Base-T Ethernet cable systems.***

Includes an RJ-45 jack for 10Base-T wiring.

DaynaPORT E/II-T NuBus Card ..... $149

***DaynaPort E/Z.*** Ideal for Macs that don't have a slot for a network interface card.

DaynaPORT E/Z ..... $269




### Dayna EtherPrint

Supports AppleTalk Phase 1 and Phase 2 protocols; divide your network into multiple zones.

| | |
|---|---|
| Dayna EtherPrint | $335 |
| Dayna EtherPrint Plus | 439 |

## BRIDGES AND ROUTERS



### Cayman

***GatorBox CS is the most advanced AppleTalk-Ethernet gateway available... connects an entire LocalTalk network to Ethernet.***

The only gateway that can be upgraded to a file-sharing and UNIX-AppleTalk printer sharing gateway. Two-year warranty.

GatorBox CS ..... $2029

### Farallon

| | |
|---|---|
| *PhoneNet Liaison Software Router* | $279 |
| *Ether 10-T Starlet (9-port)* | 279 |
| *EtherMac Cards(Mac II/LC/SE)* | 219 |
| *EtherMac Card (Si and SE/30)* | 259 |
| *Timbuktu 4.02* | 139 |
| *PhoneNet Star Controller (stand-alone hub)* | 1099 |
| *(24-port)* | 1389 |
| *PhoneNet Star EN (12-port)* | 1369 |
| *PhoneNet Card (LocalTalk)* | 219 |
| *PhoneNet Connector Din-8 (10).* | 199 |
| *PhoneNet Repeater* | 369 |



### Shiva

| | |
|---|---|
| *FastPath 5R Router/Gateway* | $1669 |
| *NetBridge* | 399 |
| *EtherGate Router* | 1239 |
| *NetSerial* | 269 |
| *NetModem/E* | 1409 |
| *NetModem V2400 (for LocalTalk)* | 329 |
| *NetModem v.32 (for LocalTalk)* | 989 |
| *Hublet* | 229 |
| *LanRover/L* | 579 |
| *LanRover/E (4-port)* | 1659 |
| *TeleBridge* | 399 |

*If you don't know which networking product will work with your particular setup, give us a call. We can help! Clockwise from bottom: Daria, Jon, Michael, Chuck, James, Ed (a few members of our friendly sales team).*



# Networking solutions.

# PowerBooks, modems & more

## *Powerful, practical, portable solutions for people on the go.*

*The PowerBook Duo 210 and PowerBook Duo 230 each transform into a desktop computer by using the optional Duo Dock. Each PowerBook Duo 210 or 230 includes:*

- 640 x 400 Supertwist liquid crystal display with 16 grayscale levels
- 4 Mb of RAM, expandable to 24 Mb
- EverWatch Battery Saver technology
- Optional internal modem

### PowerBook® Duo 210

**$2,249**

*Lease: $62/month*

25 MHz 68030 microprocessor. 80 Mb hard drive.

*All PowerBooks listed here are equipped with a 19mm trackball.*

### PowerBook® Duo 230

**$2,609**

*Lease: $71/month*

33 MHz 68030 microprocessor. FPU, 80 Mb hard drive.

PowerBook Duo 230 with 4/120.....*$2969*




### A PowerBook® 160

**$2,429**

*Lease: $67/month*

25 MHz 68030. Supertwist display. 40 Mb hard drive.

PowerBook Duo 160 with 4/80 .....*$2789*
PowerBook Duo 160 with 4/120..... *3149*

### B PowerBook® 180

**$4,109**

*Lease: $113/month*

33 MHz 68030 FPU. Active matrix display. 80 Mb hard drive.

PowerBook Duo 180 with 4/120 .....*$4469*

*Each includes: 4 Mb of RAM, expandable to 14 Mb; display with 16 grayscale levels; 1.4 Mb floppy disk drive.*

### E Kodak® Diconix 180si Portable Printer

Thermal inkjet printer can print continuous copies for up to 50 minutes. Self-contained ink supply is easy to replace.

Kodak Printer.....*$379*
*(w/Mac kit)*




## *Use your PowerBook as a portable and as your desktop computer.*

### F PowerBook Full-Page Display

**$449**

*Lease: $12/month*

Flicker-free 15" RealTech portrait display has 870 x 640 resolution, 80 dpi. Vertical refresh rate of 75 Hz. Flat CRT; anti-glare screen. Compatible with PowerBooks 160, 180, Duo Dock and Mini Dock.

### STANDARD MODEMS

Supra 2400 MacPac .....*$119*
Supra v.32 bis .....*369*
MassMicro FM 24/96 Network .....*359*
MassMicro FM 24/96 Personal .....*165*
Global Village TelePort–*Gold* .....*479*
Global Village TelePort–*Silver*.....*389*
Global Village TelePort–*Bronze* .....*219*

### Zoom Modems

9600 bps send/receive fax with a Hayes-compatible 2400 bps modem. V.42bis/MNP5 data compression provides high-speed fax and data capability. Group III compatible.

Zoom 2400 .....*$75*
Zoom FX 96/24v ..... *149*
Zoom 9600 v.32/42 bis.....*259*







### PowerBook Memory Upgrades

***Newer Technologies***

Ultra-low power DRAM design ensures long battery life.

***PowerBook 160/180***

6 Mb Upgrade.....*$279*
8 Mb Upgrade.....*389*
10 Mb Upgrade.....*479*

***PowerBook 210/230***

4 Mb Upgrade.....*$259*
8 Mb Upgrade.....*559*
16 Mb Upgrade .....*2249*

### PowerBook Modems

Global Village PowerPort–*Gold* .....*$559*
Global Village PowerPort–*Silver* .....*469*
Global Village PowerPort–*Bronze*.....*239*
PSI Integration .....*199*
PSI 10/42.....*269*
MassMicro FM 24/96 PB ....*189*
Solectek Pocket Fax.....*229*
Zoom Pocket Modem.....*119*

### POWERBOOK ACCESSORIES

Auto Power Adapter .....*$89*
Charger/Reconditioner .....*169*
Auxiliary Power Pack .....*169*
Radius PowerView .....*509*
PowerBook Battery.....*79*




### PowerBook Carrying Cases

Case G is made of genuine leather; Cases H and I are constructed of 1000 denier cordura nylon fabric and high-density foam, for maximum computer protection.

Leather Attache (G).....*$139*
SuperBrief Double-sided Carryall (H) .....*79*
Companion Case (I).....*59*


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# Storage options.

## Storage: 21-212 Mb



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21 Mb Floptical Drive and Syquest Drives
*(shown above)*




### CONNER

| | |
|---|---|
| 120 Mb Internal/External Drives | $359/449 |
| 170 Mb Internal/External Drives | 399/489 |
| 212 Mb Internal/External Drives | 589/679 |

### PERIPHERAL LAND

| | |
|---|---|
| 21 Mb Infinity Floptical Drive | $359 |
| 21 Mb Infinity Flop. (Int–for Quadra) | 329 |
| 44 Mb Turbo Drive | 549 |
| 88 Mb Turbo Drive | 629 |
| 128 Mb 3.5" Magneto-Optical Drive | 1559 |

### QUANTUM

| | |
|---|---|
| ELS 127 Mb Internal/External | $369/459 |
| ELS 170 Mb External/External | 419/509 |

### MASS MICROSYSTEMS

| | |
|---|---|
| 21 Mb Floptipak Drive | $459 |
| 45 Mb DataPak Removable Cartridge Drive | 549 |
| 88 Mb DataPak Removable Cartridge Drive | 659 |
| 128 Mb 3.5" DataPak Magneto-Optical Drive | 1559 |
| 120 Mb DiamondDrive | 589 |
| 210 Mb DiamondDrive | 729 |
| 120 Mb DiamondDrive–1" Portable | 499 |
| 210 Mb DiamondDrive–2" Portable | 679 |
| HitchHiker 80 | 619 |

*Call for information on the latest SCSI 2 technology.*

## Storage: 240 Mb-3 Gb






### NEWER TECHNOLOGIES

| | |
|---|---|
| SCSI Dart Solid State Storage System | $1789 |
| SCSI II Dart Solid State Storage System | 2949 |

### PERIPHERAL LAND

| | |
|---|---|
| 1 Gb MaxOptical 5.25" Erasable Drive | $3539 |
| 2 Gb Infinity MiniArray Drive | 5199 |

### FUJITSU

| | |
|---|---|
| 425 Mb Internal Drive | $1029 |
| 520 Mb Internal Drive | 1285 |
| 1.1 Gb Internal Drive | 1839 |
| 1.7 Gb Internal Drive | 2839 |

### QUANTUM

| | |
|---|---|
| 240 Mb Internal/External Drive | $619/705 |
| 425 Mb Internal/External Drive | 999/1085 |
| 525 Mb Internal/External Drive | 1159/1369 |

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*Macintosh Quadra 950 with 2 Mb of VRAM, 212 Mb hard drive, RealTech 19" Trinitron monitor, and Key Tronic MacPro Plus extended keyboard.*



**$3,759** *Lease: $103/mo.*
***Macintosh IIci with 14" Seiko 8-bit monitor***

*Macintosh IIci, 212 Mb hard drive, 5 Mb of RAM, Seiko 14" monitor, cache card, and Key Tronic MacPro Plus extended keyboard.*



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*Quadra 950, 8 Mb of RAM, 425 Mb hard drive, RasterOps 20" Trinitron monitor w/RasterOps PaintBoard Li and Key Tronic MacPro Plus extended keyboard.*



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Lease: $75/mo.

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Lease: $47/mo.

***Macintosh LC II*** *with 4 Mb of RAM, 40 Mb hard drive, and Sony 13" color monitor.*



**$2,435**
Lease: $67/month

***Mac IIsi Solution with RealTech Full-Page Grayscale Monitor***
*Macintosh IIsi with 5 Mb of RAM, 40 Mb hard drive, RealTech 15" full-page monitor, and Key Tronic MacPro Plus extended keyboard.*




***Macintosh IIci Business Solution***
***Macintosh IIci with 5 Mb of RAM, 212 Mb hard drive, RealTech 21" monochrome monitor, cache card, and Key Tronic MacPro Plus extended keyboard.***

**$3,969**
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# HARDWARE THAT FITS

CIRCLE 199 ON READER SERVICE CARD.

depend on the complexity of the image, the program occupies 200K of the slave's RAM, even when inactive. RenderPro has the largest requirements, demanding 4 megabytes of RAM to run on the master and 3 megabytes of RAM to run on each slave. RenderPro itself occupies 320K on each slave and swallows up 512K on the master.

### Mastering Your Slaves

Although all three products achieve the same end, they each do so differently, offering unique options along the way. DreamNet and RenderPro, for example, allow a master or a slave machine to render in the background, leaving the Mac free for other uses as it renders. The slave CPU's processing time can be divvied up so that you can continue to work on any slave in any application — memory permitting — and still dedicate a percentage of its processing time to a background rendering job.



**To take full advantage of the power of network rendering, we recommend that you use fast Macs on an Ethernet network. Network transmission and communication on LocalTalk can deprive you of your distributed gains.**

To test how this background-processing feature affects a slave's performance, we performed a find-and-replace operation on a WriteNow text file while rendering with DreamNet and RenderPro (BackBurner doesn't provide background processing). When we specified that the rendering task be given 50 percent of the slave's processing power, both the find-and-replace chore and the background rendering proceeded without a hitch, but the speed of the rendering and the find-and-replace task slowed by about 50 percent.

To test the accuracy of the settings that let you designate the amount of processing power to be shared, we copied a 5-megabyte file between two of the slave machines at different settings. We found RenderPro's settings to be more accurate than DreamNet's. We also tried to recalculate a complex Excel spreadsheet on a slave machine that was busy rendering. BackBurner worked without a hitch during the

**Figure 1: 1 Mac + 1 Mac = 1 Superfast Mac**

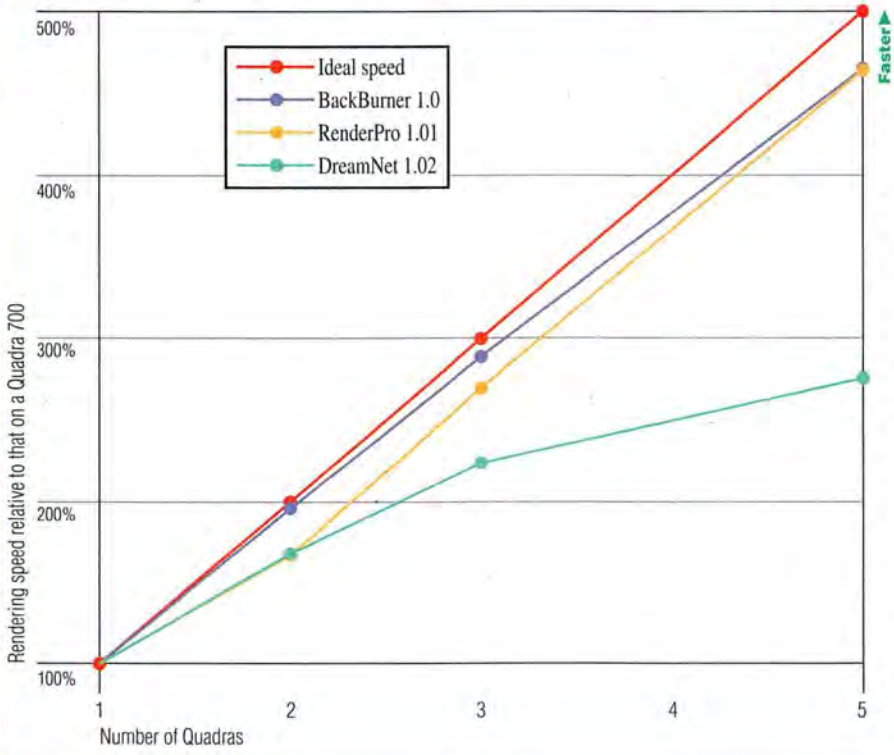



**Figure 1: Rendering a complex 3-D image takes a long time, even if you use a high-speed Mac. Combining the power of multiple Macs speeds things up considerably. Using our test network, which consisted of a Quadra 900 as master and four Quadra 700s as slaves, we timed how long it took to render a complex image on one, two, three, and five Quadras. We then compared this speed with the theoretical, ideal speed that would be achieved if there were no network or communications delays. (For example, if one Mac took 10 minutes to render an image, two Macs would ideally take 5 minutes to render the same image.) Specular's BackBurner came closest to the ideal, offering the greatest overall speed increases with the addition of more machines.**

# WHY DO I NEED A SUPRA FAX MODEM?

Why do I need a fax modem? That's exactly what I thought! As a graphic designer at Supra, my job is to design great-looking stuff,




not to use our products. So I was skeptical — and downright reluctant — when my boss told me to start using a SupraFAXModem.

But I tried it. And I love it! Here's why...

**SAVES TIME.** Now I have extra time because I don't wait in line at the fax machine anymore — in fact, I don't even leave my desk! I simply use the Chooser to select the modem (instead of a printer), "print" an open file, and tell the modem where to send it. It only takes a minute!



**SAVES MONEY.** Besides the money we save because I'm designing instead of "chasing paper," I save a lot by using the SupraFAXModem's data capabilities. It's usually less expensive to transfer a file using my modem than to use an overnight delivery service. And because SupraFAXModems feature V.42bis data compression, my files transfer up to 4 times faster — which means lower long-distance charges! It has also saved me when I've forgotten important files at work, because I can easily call our network and retrieve them using **AppleTalk Remote Access.**

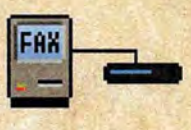


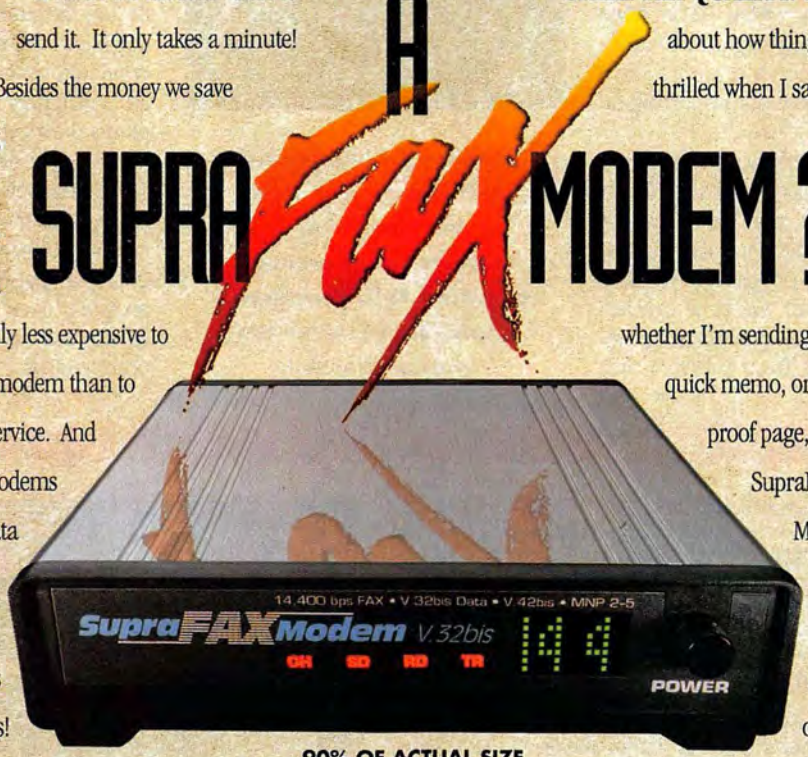
**CIRCLE 90 ON READER SERVICE CARD.**

**EASY TO USE.** Not being particularly technical, I was a little intimidated when my boss dropped the modem on my desk and said "Go for it." But getting started was easy. The SupraFAXModem for Macs has everything I need in the box — FAXstf™ and MicroPhone™ 1.6 software, cables, and manuals — so I dove in. A great little 16-page manual walked me through installing the modem (which went really fast), sending and receiving my first faxes, and transferring data files. The software was easy to use, worked great with my Mac, and did everything I wanted it to. Before I knew it, I was using a fax modem!



**GREAT FAX QUALITY.** As a graphic designer, I care about how things look. That's why I was thrilled when I saw how clear the faxes I send look when they reach the fax machine on the other end! It doesn't matter whether I'm sending a quick memo, or a proof page, the SupraFAX-Modem faxes a near laser quality, perfect page.




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**GOOD FOR THE PLANET.** And to top it all off, my SupraFAXModem Modem lets me avoid extra printouts and non-recyclable fax paper!



I strongly recommend that all Macintosh owners consider the benefits of using a **SupraFAXModem.**

Randy Hill
Supra Graphic Designer

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recalculation, but we couldn't even open the spreadsheet test file when either DreamNet or RenderPro was at work; each program required more memory than was installed.

### Crash Landings

Finally, we intentionally crashed slaves during the network rendering process to see how well each product could recover. DreamNet fared the worst, as it does not provide any crash recovery. RenderPro and BackBurner both offer crash recovery, although only BackBurner handles such events with flair — and with status messages that let you know which slaves have disconnected. BackBurner also automatically reconnects a restarted slave and puts it back to work, reporting on its status along the way.

BackBurner goes the extra mile; it is the only product that can recover even when the master machine crashes. BackBurner's master machine saves a render-in-progress to its hard disk. If the master machine crashes and you restart it, the BackBurner render can continue from where it left off. On the other hand, if the master Mac that's handling a DreamNet or RenderPro network rendering session crashes, you lose all the work that's been done up to that point — even if the master and its slaves have been churning away for an hour or more.



**We intentionally crashed both master and slave machines to see how well each product recovered. Only BackBurner could recover when the master crashed.**

A product as feature-laden as Specular's BackBurner requires a lot more explanation than the other products. Although BackBurner's documentation is thorough, it isn't as elegantly written or as well thought out as the application itself. The manual provides a conceptual overview of the product and an explanation of the features, but it isn't particularly well organized and has a poor index.

DreamNet's documentation comes in a small booklet that clearly describes the concept of network rendering. Because DreamNet is simply a System 7 extension and not a full application, the booklet's few pages are sufficient. The booklet also explains the simple procedure of selecting multiple Macs for a render and of saving the selected Macs as a named configuration.

The RenderPro documentation gives a good explanation of the program's scheduling feature, network-zone selection, and machine optimization.

## The Bottom Line

A network renderer can harness the power of all the Macs on your network to accomplish complex 3-D rendering in a fraction of the time it would take on a single Mac. Choosing the right network renderer for your needs is simple: If you already own 3-D modeling software, buy the companion network renderer. All three of the network renderers we tested for this month's report can reduce rendering time dramatically. (If you're looking for the right modeling software, see "The Third Dimension," September '92, page 114.)

Of the three products we reviewed, we found Specular's **BackBurner** (first two nodes, $395; additional node, $295; three-node pack, $695) the most elegantly designed. Its excellent speed is helped by the intelligent transfer of texture maps across the network. Fast speed combined with excellent online status information are but two fine features of a product that's very well thought out.

Strata's **RenderPro** (three-node pack, $695; ten-node pack, $1,495) offers an excellent speed increase and a unique scheduling system that lets users give up their machine at predesignated times.

Ray Dream's **DreamNet** ($50 per node) offers a good Chooser-like interface for administering the slaves plus a substantial speed increase, although less than that of the other products. But quickly rendered images aren't the only attractive thing about DreamNet: At $50 per user, it's the hands-down best buy among network renderers.




**You'll see a dramatic improvement in rendering speed with one of these three network renderers (from left to right): Ray Dream's DreamNet, Specular International's BackBurner, and Strata's RenderPro.**



# PC To Mac File Exchange Without Translators Is Like A Foreign Film Without Subtitles.

Sharing files between PCs and Macs is no longer a luxury, it is a necessity. But it doesn't have to be a foreign concept.

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CIRCLE 172 ON READER SERVICE CARD.

For those hampered by seemingly endless rendering sessions who want to increase their productivity, Specular's BackBurner, Ray Dream's DreamNet, and Strata's RenderPro each represent an excellent network rendering solution. The increase in speed depends on the number of Macs available, the horsepower of each Mac, and whether those Macs are networked via LocalTalk or via Ethernet.

These three network renderers have pioneered Mac distributed processing, a technique that is sure to affect how all computationally intensive tasks are performed. Imagine a day in your future when each Macintosh on your network, working at its own pace, will selflessly contribute to the common good. This is not a naive computer socialist's rosy picture of the future but the altogether reachable goal of distributed processing — and network renderers got there first.

**Stefan B. Lipson is a *MacUser* associate editor. Sean Safreed is a MacUser Labs technician.**

## Table 1: Features of Network Rendering Software

| ● = yes<br>○ = no | BackBurner 1.0<br>★★★½ | DreamNet 1.02<br>★★★½ | RenderPro 1.01<br>★★★½ |
|---|---|---|---|
| **List price** | first two nodes, $395<br>additional node, $295<br>three-node pack, $695 | $50 per node | three-node pack, $695<br>ten-node pack, $1,495 |
| **Pros** | Easy installation. Excellent speed. Low memory requirement. Elegant master and slave crash recovery. | Low price. Easy installation. Very good speed. Storable network configurations. | Excellent speed. User-definable scheduling. Slave crash recovery. |
| **Cons** | Cannot operate in the background. | Poor memory management. No crash recovery. | Convoluted installation procedure. High memory requirement. |
| **Associated modeling software** | Infini-D 2.0 | Ray Dream Designer | StrataVision 3d |
| **RAM requirements** | | | |
| Master | 2 MB | 3.58 MB | 4 MB |
| Slave | 2 MB | 3 MB | 3 MB |
| **Features** | | | |
| Image queuing | ● | ● | ○ |
| CPU-cycle allocation | ○ | ● | ● |
| Password security | ● | ○ | ○ |
| Scheduling | ○ | ○ | ● |
| **Crash recovery** | | | |
| Master | ● | ○ | ○ |
| Slave | ● | ○ | ● |
| **Company** | Specular International<br>233 N. Pleasant St.<br>P.O. Box 888<br>Amherst, MA 01004<br>413-549-7600<br>413-549-1531 (fax ) | Ray Dream, Inc.<br>1804 N. Shoreline Blvd.<br>Mountain View, CA 94043<br>415-960-0766<br>415-960-1198 (fax) | Strata, Inc.<br>2 W. St. George Blvd.<br>Ancestor Square, Ste. 2100<br>St. George, UT 84770<br>801-628-5218<br>801-628-9756 (fax) |

## Table 1 Criteria

**Associated modeling software** — The name of the software, from the same company, that is used to create the 3-D model for rendering. Network renderers work only with images created in the associated modeling software.
**RAM requirements** — The space the application needs for rendering on the master or the slave machine, in megabytes.
**Image queuing** — Can a list of files be designated for rendering in succession?
**CPU-cycle allocation** — Is the slave able to designate the percentage of CPU cycles it will use when processing a network rendering in the background?
**Password security** — Can access to a rendering slave be limited by a password?
**Scheduling** — Can a slave's availability be defined by a rendering calendar or schedule?
**Crash recovery** — Can a master or slave reconnect and continue a rendering job that has been interrupted by a system crash?

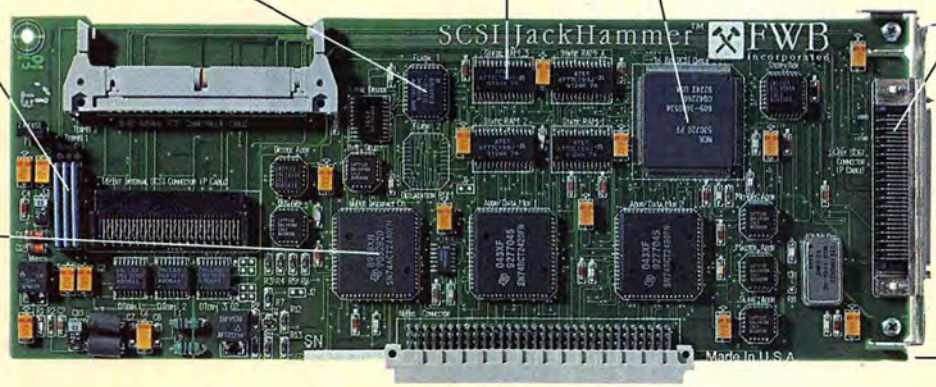
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*Active termination eliminates termination hassles*




*68-pin, 16-bit wide SCSI-2 connector includes a 68/50-pin adapter cable for connecting any SCSI drive*

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The JackHammer achieves these blazing speeds by freeing the CPU from having to oversee the drive's I/O operations. Which means that your Mac can focus its CPU power on what it does best: processing. Not only that, the JackHammer gives you all this at a very affordable price—and one that's even more affordable when you purchase it with an FWB drive.

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CIRCLE 84 ON READER SERVICE CARD.

# Can You Read This?

# OCR Software

*There's hope for the hunt-and-peck crowd. We look at eight OCR packages that help you input reams of documents without hiring a temp.*

**BY ELISA M. WELCH**

If your job requires you to manage a lot of information, you've got a problem: Although some information comes in neat little electronic packets, ready to click and drag, most arrives in messy printed form. Your desk is probably teeming with dog-eared laser-printed copies from the sales department, blurry faxes from associates on the road, and even dot-matrix-printed letters from customers. If you want to get all this information into your Mac, someone — you or (if you're lucky) your assistant — has to retype the sometimes-lengthy documents. It's a tough job, but someone's got to do it — maybe.

You may have considered using a scanner to input those documents. However, scanning any document produces a bit map — a pixel-by-pixel representation of the overall image in

PHOTOGRAPHY: PIERRE-YVES GOAVEC

O
MNI
PAGEWO
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TPERTACCUTEXTREADI
TIOMNIPAGEWORDSCANTEX
TPERTACCUTEXTREADIT!OMNIPA
GEWORDSCANTEXTPERTACCUTEXTREADI

## Table 1: Plug It In

| ● = yes ○ = no | AccuText 3.0 | OmniPage 3.0 | OmniPage Direct 1.0 | OmniPage Professional 2.1 | Read-It! 3.0.1 | TextPert 3.7 | WordScan 1.0 | WordScan Plus 1.01 |
|---|---|---|---|---|---|---|---|---|
| Abaton | ○ | ● | ● | ● | ○ | ○ | ● | ● |
| Agfa | ● | ● | ● | ● | ○ | ● | ○ | ○ |
| Apple | ● | ● | ● | ● | ● | ● | ● | ● |
| Brother | ○ | ● | ● | ● | ○ | ○ | ○ | ○ |
| Canon | ○ | ● | ● | ● | ○ | ● | ○ | ○ |
| Chinon | ○ | ○ | ● | ● | ○ | ○ | ● | ● |
| Complete PC | ○ | ● | ○ | ○ | ○ | ○ | ○ | ○ |
| Datacopy | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Dest | ○ | ● | ● | ● | ○ | ● | ○ | ○ |
| Epson | ○ | ○ | ● | ● | ○ | ● | ● | ● |
| Fora | ○ | ○ | ● | ● | ○ | ○ | ○ | ○ |
| Fujitsu | ○ | ● | ● | ● | ○ | ● | ○ | ○ |
| Getronics | ○ | ○ | ● | ● | ○ | ○ | ○ | ○ |
| Howtek | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● |
| Hewlett-Packard | ● | ● | ● | ● | ● | ● | ● | ● |
| La Cie | ○ | ● | ○ | ○ | ○ | ○ | ● | ● |
| Lightning Scan | ○ | ○ | ○ | ○ | ● | ○ | ○ | ○ |
| Microtek | ● | ● | ● | ● | ● | ○ | ● | ● |
| Panasonic | ○ | ○ | ● | ● | ○ | ○ | ● | ● |
| Pentax | ○ | ● | ● | ● | ○ | ○ | ○ | ○ |
| Ricoh | ○ | ● | ● | ● | ○ | ○ | ○ | ○ |
| ScanMan | ○ | ○ | ○ | ○ | ● | ○ | ○ | ○ |
| Siemens | ● | ● | ● | ● | ○ | ○ | ○ | ○ |
| SIIG | ○ | ○ | ● | ● | ○ | ○ | ○ | ○ |
| Umax | ○ | ○ | ● | ● | ○ | ○ | ○ | ○ |
| Visa | ○ | ○ | ● | ● | ○ | ○ | ○ | ○ |

**Table 1: Need to know which OCR programs work with the flatbed scanner you already own? Here's a list of popular scanner brands supported by the software we tested. For information about specific scanner models, contact the OCR company (addresses and phone numbers can be found in Table 2 at the end of this article) or your scanner's manufacturer.**

the computer's language of 1s and 0s. A bit map is perfect if what you want to do is manipulate an image with your favorite painting application or image-editing software. But if you want to edit or access data, you won't be able to, because a word-processing or spreadsheet application doesn't speak bit-map-ese. Instead, it defines letters and numbers by using a code called *ASCII* (American Standard Code for Information Interchange). When you're editing a letter in Microsoft Word or refining your latest financial projections in Excel, you're manipulating ASCII-coded letters and numbers, not just pushing pixels.

To turn scanned text into an editable document, you need a translation application that uses a technology called *OCR* (optical character recognition). Numerous OCR-software products are available for the Mac as well as for other computer platforms. Some come bundled with inexpensive hand-held scanners, and others are incorporated into expensive OCR-dedicated workstations. If you're like most Mac users, you're somewhere in between: You've already equipped your office with an assortment of Macs and business software, and you either have or are ready to buy a flatbed scanner. Table 1 lists several popular scanners and which of the tested OCR programs support them. Table 2, at the conclusion of this article, provides details about the memory and system-software requirements of each of these OCR programs.

We tested eight stand-alone OCR-software packages for the Mac, ranging in price from Calera's WordScan 1.0, at $295, to Caere's OmniPage Professional 2.1 and Xerox's AccuText 3.0, at $995. The other programs we evaluated were OmniPage 3.0 and OmniPage Direct 1.0, from Caere; Read-It! 3.0.1, from Olduvai; TextPert 3.7, from CTA; and WordScan Plus 1.01, from Calera. We tried to run OCR Systems' ReadRight 1.0, but it consistently locked up our testing platform (see the "How We Tested" sidebar for a description of our setup). OCR Systems' technical-support department was unable to resolve the problem. Another package, ExperVision's TypeReader, was not released in time to be included in our extensive

lab testing, but the December '92 review (page 81) found it to be quite impressive.

### What Do You Expect?

If a document is difficult for you to read, it will be even more of a challenge for your OCR software to decipher. (For an explanation of how OCR works, see the "Translation, Please" sidebar.) Here's a suggestion: When deciding whether to type a document manually or to scan it and use OCR to recognize it, subtract several reading levels from your own. You've been reading for most of your life, after all. You've learned to interpret characters and words in a variety of type styles and sizes — you can even read handwriting. If part of a sentence has been crossed out and rewritten, you can follow the correction. If a word is misspelled, you can probably figure out what was intended, by making a short mental leap.

Such flexibility is a giant step for OCR, which has been available for the Mac only since 1988, when Caere shipped its first version of OmniPage. An OCR program must first break up the bit map into chunks that look like letters and then compare the chunks with its internal bit-map database of letters, decide on the best-choice match, and piece the letters together into words. You can immediately recognize a word such as *Macintosh,* and you may get a mental picture of your computer when you see the word. But an OCR program has to scrutinize each and every shape to identify the letters, and even after it's done this, it still has no concept of what a Macintosh is. That's why it might guess *Madntosb,* for example.

But before you abandon OCR software as the electronic equivalent of a preschooler, think again. Many of these programs do a reasonable job of interpreting printed text, and they don't get bored reading the same tired phrases over and over. With the right documents, the right OCR software, the right scanner, and a little practice, you can gain a lot of productivity.

### (Mostly) Easy Installation

All the OCR programs we tested assume that a flatbed scanner is already a part of your computer system. Some of these programs can use your scanner's existing *driver,* the software that enables your computer to communicate with your scanner. If you've already installed a scanner, its driver most likely resides in your Mac's System Folder. Other OCR programs come with their own scanner drivers, and you install these drivers along with the OCR software.

OmniPage Direct is the easiest to install: It's contained on a single high-density floppy disk and, when installed, appears as an item on the Apple menu, so you can access it from within an open word-processing or spreadsheet application. OmniPage Professional comes on two high-density disks. You need to be sure your Mac is equipped with a SuperDrive to install either of these programs. All the others are installed from double-density disks.

WordScan comes on six disks, and WordScan Plus is installed from four. Either program appears in a folder called Calera Folder on your hard disk, and each comes with its own scanner

### How We Tested

ZD Labs, the testing facility that provides some of the data used by *MacUser* and other Ziff-Davis publications, performed the OCR tests for this article. The objective was not only to identify the best OCR package but also to find out what kinds of documents could be recognized acceptably by the software available.

Our hardware consisted of a familiar office configuration: a Macintosh IIci with 8 megabytes of RAM and a 200-megabyte internal hard drive connected to a monochrome full-page display. We ran System 7.01 in 32-bit mode with virtual memory switched off.

To scan our test pages, we used a popular scanner, a Hewlett-Packard ScanJet IIc with an automatic document feeder. The scanner's built-in AccuPage capability provides two advantages: *dynamic thresholding,* which automatically adjusts the brightness level, enabling it to distinguish text from a shaded background, and automatic recognition of page composition such as columns and tables.

We tested documents commonly found in business environments, beginning with a two-page business letter printed on letterhead with a logo. The letter contained 586 words (3,223 characters) and included some difficult letter combinations (*rn, 8B, 5S, il*); italic, bold, and underlined words; and a small table.

Because so many offices communicate by fax, we tested a 12-point Times version of the letter in three fax configurations: one sent from a fax machine in high-resolution mode and received by a fax modem, another sent from a fax machine in high-resolution mode and received by a fax machine, and a third sent by a fax machine in normal mode and received by a fax machine.

We also tested an assortment of other business documents: an Excel spreadsheet, to determine whether the recognized data could be exported usefully into a spreadsheet; a waterfall of letters and numbers in sizes ranging from 6 to 36 points; a complex invoice with a shaded background and difficult alphanumeric codes; and a multicolumn table from *MacUser.*

To correct for any irregularities, we performed three recognitions for each document with each OCR program. Wherever possible, documents were loaded with the automatic document feeder; the remaining documents were placed directly on the scanner bed.

We divided errors into three categories: characters the OCR software admits it cannot recognize (shown as a tilde or a bullet), incorrectly interpreted characters, and the omission or insertion of spaces. The sum of these errors constituted the error count for accuracy determination.

We ran a series of tests with the same document scanned at 400 and 300 dpi. For smaller characters (6 to 12 points), some OCR programs showed greater accuracy at the higher resolution; for larger characters (larger than 30 points), however, accuracy suffered at the higher resolution. We concluded that letters scanned at higher resolution are interpreted as larger letters by the OCR engines; hence a program that recognizes sizes between 8 and 36 points at 300 dpi may recognize sizes between 6 and 30 points at 400 dpi.

— Mark Jonikas

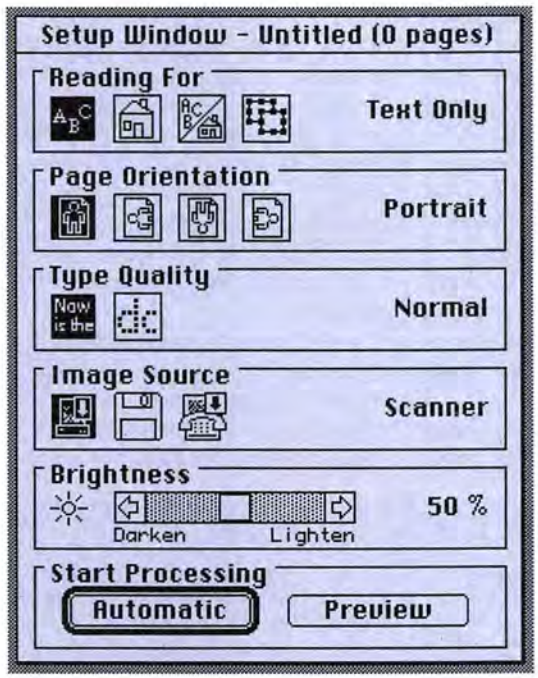



**Figure 1: The Setup Window in WordScan Plus offers a variety of input choices, including four page-orientation options. However, when we selected the second — called Landscape — the preview showed us the fourth — called Flipscape.**

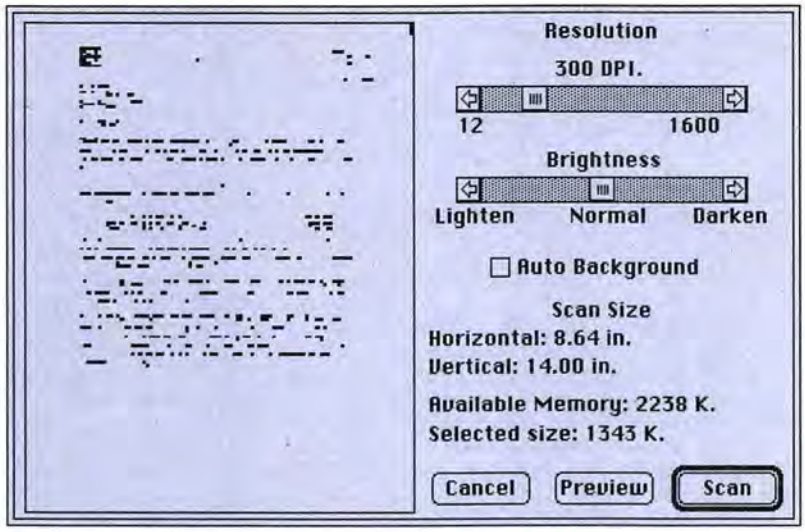



**Figure 2: Read-It!'s preview scan doesn't provide enough detail on-screen for you to decide whether the scan will be readable.**

driver. When we used WordScan Plus' Easy Install option, it failed to install the driver. We had to locate the scanner driver (on disk 4) and manually drag it into the System Extensions folder.

The AccuText package has seven disks, but four provide an assortment of foreign-language dictionaries; if you're working in English, you need copy files from only three disks. TextPert and its scanner driver are installed from three or four floppy disks, depending on the configuration of your scanner.

### A Look at the Books

Many Mac users are loath to look at product manuals, but you need to do some reading to make the most of these OCR packages. At first glance, TextPert's documentation looks like a nice idea: The manual and the program disks are in an attractive three-ring binder; however, the odd shape of the rings makes it difficult to turn pages. The "Getting Started" section features a quaint entry-level tutorial on using the mouse and menus but has no information on installing the software. (Reportedly this information is provided in a separate *Installation Guide*, but the guide was not in any of the three sets of software we received.) The manual also contains some basic errors, such as referring to the Mac's Command key as the Control key.

Read-It!'s manual includes a step-by-step tutorial to get you started. But some of its in-depth instructions are more confusing than helpful. For example, the Recognize & Learn Confidence Level setting is discussed in numerous places: Sometimes the manual indicates that a lower confidence level makes Read-It! "screen entries more critically"; at other times, a higher confidence level is said to do this. In reality, the higher the confidence level, the more often Read-It! prompts you to check its choices; at the lowest confidence level, Read-It! chooses without consulting you.

AccuText has the thickest manual, and you'll need to refer to it frequently to find your way around in this application. The documentation contains detailed information on setup, scanner settings, advanced features, and error messages. There's also a tear-out reference card at the back of the book.

WordScan and WordScan Plus are both covered in a single manual, with separate chapters entitled "Getting Started" and "Additional Features" for each program. The manual includes plenty of illustrations of the programs' dialog boxes and menus, but having two programs covered in one manual is confusing.

The OmniPage and OmniPage Professional manuals are well written, well illustrated, and well organized, offering various levels of detail to suit

individual users. OmniPage Direct comes with a succinct, well-organized manual. Because the program imports recognized text right into your open application, you may not need to refer to the manual very often.

### Ease of Use

All the programs provide a preview scan that lets you check for basic problems such as an upside-down page. WordScan and WordScan Plus allow you to adjust the page orientation in the programs' Setup Window instead of making you reset the page in the scanner. However, we did notice that the programs' landscape-orientation settings were reversed: If you select the second page-orientation option, your page will appear as if you had selected the fourth option (see Figure 1). Read-It's preview scan doesn't provide enough detail to tell you whether the scan will be usable (see Figure 2).

WordScan's initial recognition stage is fairly straightforward: In the Setup Window, click on the Automatic button under Start Processing. Once the text has been recognized, however, you must select Verifier, on the Options menu, to see the text. WordScan does a better job of retaining the document's format than any of the other programs, but its Verifier window isn't the best.

OmniPage Direct is the easiest to use. Simply open a window in your target application — in a Microsoft Word file, for example — and position your cursor where you want the recognized text to appear. Then access OmniPage Direct from the Apple menu and click on the Scan button in the Scan Text dialog box. The program will scan and recognize the text and paste it into your open file. If you haven't opened a window, the program will paste the recognized text into the Clipboard.

### Proofing

Because you can't expect your OCR program to recognize every single character correctly, you need to proof

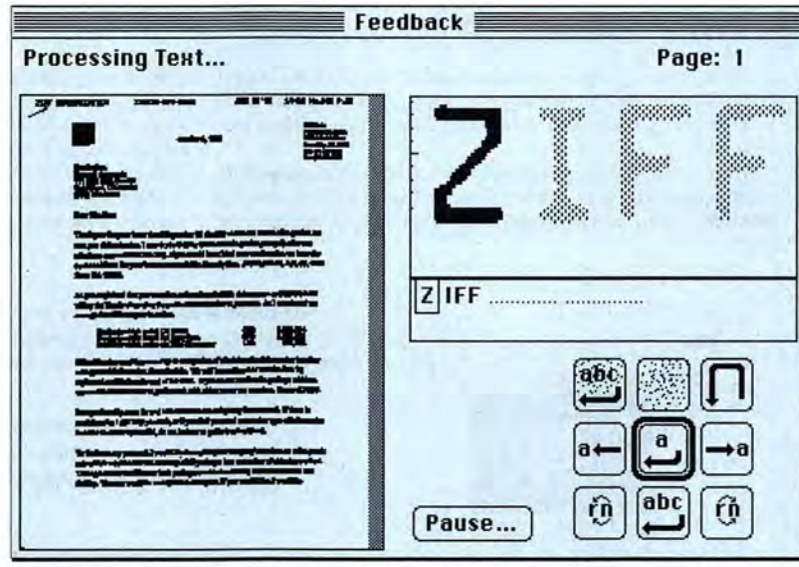



**Figure 3: AccuText's Feedback window provides a pop-up bit map of the scanned image along with the program's interpretation of the characters. You can use the keypad to navigate forward and backward and to type in corrections.**

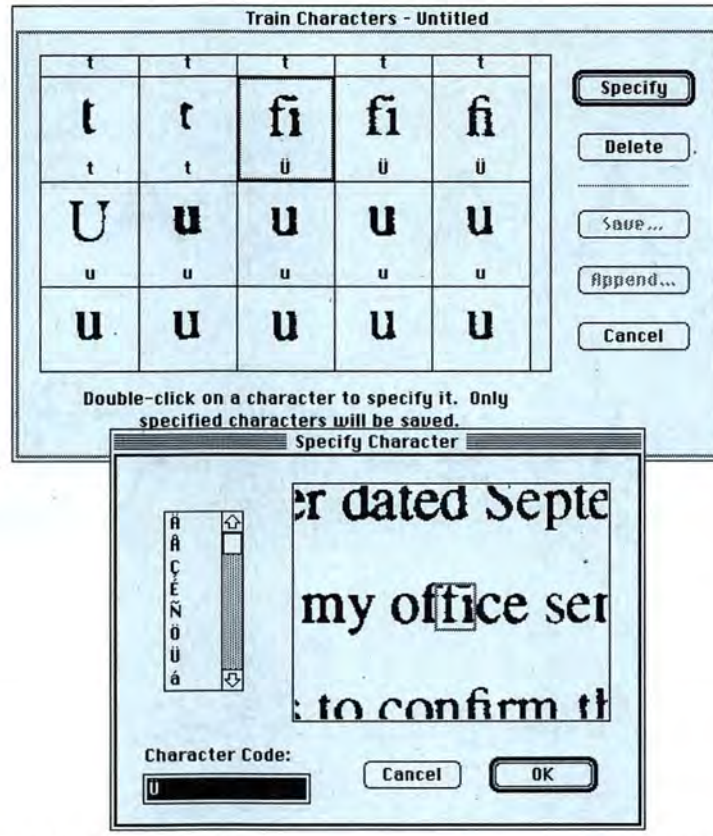



**Figure 4: In OmniPage Professional's Train Characters window, you can teach the program to recognize an unusual character by selecting its bit map and then clicking on the Specify button.**

## Translation, Please

The OCR programs we tested are called *omnifont* packages, because they attempt to interpret all (omni) fonts. Other OCR technologies employ *matrix matching*, a technique designed for use with single fonts.

The omnifont process is sometimes called *feature extraction*, because it examines character boxes for features or shapes. For example, it may spot a triangle and half a hexagon in a box and then, by comparing these shapes with an internal database or library of shapes, narrow its choice down to the uppercase *A*. This basic structure holds true over a wide variety of fonts, whether the letter is cleanly printed or even somewhat degraded because of poor document quality.

Here's a look at the steps current omnifont OCR programs perform once a page has been scanned:




**1.** The software ascertains which areas contain graphics, relying on such techniques as density analysis, and then *dismisses these areas* as far as text recognition is concerned.

**2.** The program then breaks down the page into *columns and text blocks*, using built-in algorithms that take empty gutters of white space into account.

**3.** The program searches for spaces and defines *character boxes* as the areas between them. If characters are not so simply defined — kerned, thick, or smudged characters touching, as with ligatures — the program may employ a built-in database to help break the lines into boxes.

Apple

**4.** The page is processed, character box by character box, with whatever techniques the program supports. In general, omnifont programs examine each character box, looking for shapes, and then try to *match those shapes* with ones in an internal database or library. If the program is confident that a match has been made, the character is recognized and written to a file.

Shapes library

**5.** If the software doesn't find a definite match, it may turn to a *spelling dictionary* to find the most likely choice, given the character box's context within the word.

Shapes library

Pppple = no match

Apple = Apple

**6.** The program may also *flag these characters* as suspect, so that the user is forced to confirm the program's selection.

Shapes library

**7.** If the program cannot recognize the character with the required level of confidence, it *inserts a special character* (often a tilde) to alert the user.

— Gregory Wasson

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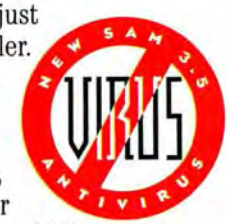
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## The Good, the Bad, and the So-So

Publishers of OCR software often quote high *percentage-accuracy* ratings in describing how well their programs recognize text. But what do these figures really mean? You may think 94-percent accuracy sounds pretty good, until you do some quick arithmetic. Consider a two-page, 586-word (3,223-character) business letter. At 94-percent accuracy, that document would contain 193 errors. Would you hire a typist who made 193 errors in a two-page letter?

To debunk these percentage ratings, we compared recognition results for a typical business letter and carved up the nebulous percentage-accuracy territory into useful chunks. We felt that recognition was *good* when the 3,223-character document was more than 98.5-percent accurate, meaning that it contained 48 or fewer errors (sample at left). Yes, someone has to find and correct those errors, but assuming that your word-processing application has a spell-checking capability, making the corrections takes much less time and effort than retyping the letter manually.

At 97-percent accuracy, the same document contained 96 errors (sample in middle). We felt that this was an *acceptable* level of recognition: more errors to correct but still a better solution than retyping the document. Between 94.5- and 97-percent accuracy (97 to 177 errors) we judged to be a *gray area*. Your proofing resources, your own typing skills, and the nature of the document (a one-time job or two out of hundreds of similar pages) will help you decide whether it's easier to make corrections to the recognized document or retype it.

Less than 94.5-percent accuracy (more than 177 errors; see sample at right) was not a gray area, in our opinion — you'd get better and faster results by retyping the document.



October4, 1992

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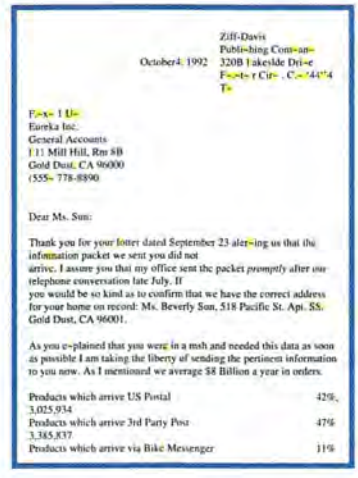
Dear Ms. Sun:

Thank you for your letter dated September 23 alerting us that the information packet we sent you did not
arrive. I assure you that my office sent the packet promptly after our telephone conversation late July. If
you would be so kind as to confirm that we have the correct address for your home on record: Ms. Beverly Sun, 51~8 Pacific St. Apt. 5S, Gold Dust, CA 96001.

As you explained that you were in a rush and needed this data as soon as possible I am taking the liberty of sending the pertinent information to you now. As I mentioned we average $8 Billion a year in orders.

Products which arrive US Postal 42%
3,025,934
Products which arrive 3rd Party Post 47%
3,385,837
Products which arrive via Bike Messenger11%

**Good Recognition:**
**If a 3,223-character letter contains 48 errors, as in this example, it is 98.5-percent accurate. Someone will have to correct all those errors, but that's probably easier than retyping the entire document. We consider this good recognition.**



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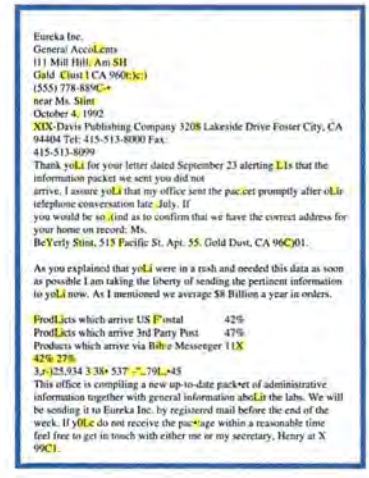
Dear Ms. Sun:

Thank you for your letter dated September 23 aler~ing us that the information packet we sent you did not
arrive. I assure you that my office sent the packet *promptly* after our telephone conversation late July. If
you would be so kind as to confirm that we have the correct address for your home on record: Ms. Beverly Sun, 518 Pacific St. Apt. 5S, Gold Dust, CA 96001.

As you e~plained that you were in a rush and needed this data as soon as possible I am taking the liberty of sending the pertinent information to you now. As I mentioned we average $8 Billion a year in orders.

Products which arrive US Postal 42%,
3,025,934
Products which arrive 3rd Party Post 47%
3,385,837
Products which arrive via Bike Messenger 11%

**Acceptable Recognition:**
**Ninety-six or fewer errors out of 3,223 characters means 97-percent or better accuracy. We felt that this was still better than retyping the document and was therefore acceptable recognition.**



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Thank yoLi for your letter dated September 23 alerting L1s that the information packet we sent you did not
arrive, I assure yoLi that my office sent the pac:cet promptly after oLir telephone conversation late July. If
you would be so ,(ind as to confirm that we have the correct address for your home on record: Ms.
BeYerly Stint, 515 Pacific St. Apt. 55. Gold Dust, CA 96C)01.

As you explained that yoLi were in a rush and needed this data as soon as possible I am taking the liberty of sending the pertinent information to yoLi now. As I mentioned we average $8 Billion a year in orders.

ProdLicts which arrive US P'ostal 42%
ProdLicts which arrive 3rd Party Post 47%
Products which arrive via Bike Messenger 11X
42% 27%
3,(~)25,934 3 3l0• 537 -~.79L.•45
This office is compiling a new up-to-date packet of administrative information together with general information abcLit the labs. We will be sending it to Eureka Inc. by registered mail before the end of the week. If y0Lc do not receive the pac•age within a reasonable time feel free to get in touch with either me or my secretary, Henry at X 99C1.

**Maybe So, Maybe Not:**
**Between 94.5- and 97-percent accuracy was what we considered a gray area. However, we felt that anything below 94.5-percent accuracy — more than 177 errors out of 3,223 characters — was poor recognition.**

**OCR packages are often sold with the promise of high accuracy, but some basic arithmetic shows how a little inaccuracy can be a big problem. We've carved up this accuracy territory to provide some guidelines. Your own decisions on where to draw the line between *good* and *acceptable* or *gray area* and *bad* may vary.**

the results and make corrections. Some packages let you do this entirely on-screen before they export the recognized text to your word-processing application. Others assume that you prefer to make corrections after exporting the text, while referring to the original piece of paper.

The on-screen approach, offered by AccuText, Read-It!, TextPert, and WordScan Plus, involves a pop-up bit map, a detailed area of the scan showing a close-up of the image from which the OCR has interpreted a letter or letters. You can then judge whether the OCR program has made a correct interpretation and either accept its choice or override it and type in your own. Some of the programs that employ the bit map allow you to train them to interpret characters you choose, as described in the next section of this report.

With the postexport correction scheme, instead of referring to a bit map, you take the original document out of your scanner and compare the scanned text with it. This choice is advocated by Caere, which provides only limited user control of proofing







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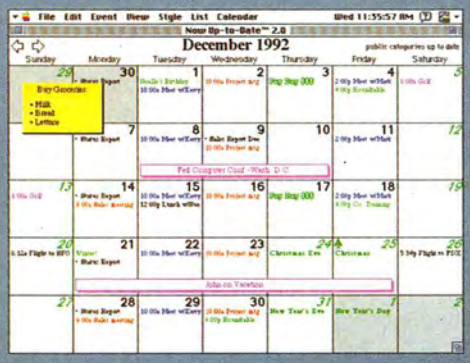
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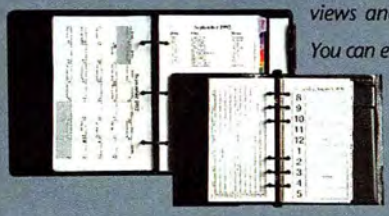
▼ *The To Do list lets you schedule tasks for certain due dates or simply for whenever you get around to them. It also allows you to prioritize tasks and automatically forwards them on to the next day's To Do list until each task is completed.*




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**Figure 5: Overall Performance**

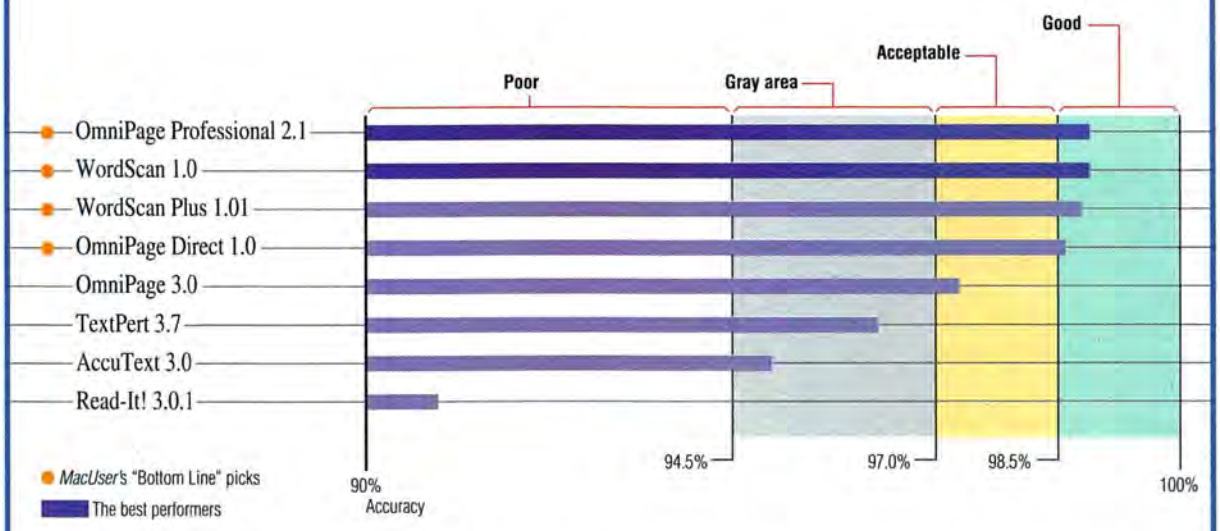



**Figure 5:** In order to arrive at an overall accuracy rating, we considered the results of the tests discussed in this article (see Figures 6 through 9 for individual test scores). Because business letters tend to be the most common documents you're likely to encounter, we gave more weight to the results of our tests with the business letter in its various permutations and less weight to the results of our spreadsheet, invoice, and table tests. And following our own recommendations about appropriate documents, we included the results for the darker photocopy — not the lighter one — and the high-resolution-mode fax — not the normal-mode one. Overall, the products from Caere and Calera proved to be strong contenders, and Olduvai's Read-It! brought up the rear.

in OmniPage Professional and none at all in OmniPage and OmniPage Direct. The advantage of this scheme is that you can make corrections by using an application with which you're already familiar.

WordScan provides a Verifier window, which shows the recognized text with any questionable or unrecognized characters and words highlighted. You navigate forward through the highlighted characters, or markers, typing corrections as necessary. This interface is clumsy and inflexible, though. WordScan Plus' version is called the Pop-Up Verifier: When you go to the next marker, a bit map of the character(s) is displayed to aid your decision making. AccuText has the most advanced verifier.

### Training

If your documents contain nonstandard technical symbols, you may want to train the OCR package to interpret the symbols as words: Ω as *ohm*, for example. Three of the packages offer trainable modes designed to improve the recognition of hard-to-recognize or unusual characters.

AccuText's training features are the most flexible, if a bit complicated; you need to read the manual to decipher how the buttons function. The Feedback window (see Figure 3) provides a graphic display — a limited-context bit map of the scanned image — with a text display below it showing an interpretation of the highlighted characters. When the bit map shows incomplete sections of letters, or when you want the program to recognize pairs or groups of letters, you can navigate forward or backward to include more of the bit map in the interpretation. You can also type letters into the text display if the recognition is incorrect or incomplete.

OmniPage Professional also provides a trainable mode, but it's not as flexible as that of AccuText. When you click on Train in the Recognition Settings dialog box, a table appears that contains out-of-context bit maps with the program's interpretation of each character (see Figure 4). You

**Figure 7: Do You Copy?**

**Figure 7:** The scores on the left represent the results of scanning and recognizing text on our two-page letter after it had been photocopied three times at a darker setting. All the programs earned lower scores with the same letter after it had been photocopied three times at a lighter setting. OmniPage Professional and OmniPage Direct did better than the other programs, but in this accuracy range, the text requires a lot of correction.

## Figure 6: Basic Business Letters

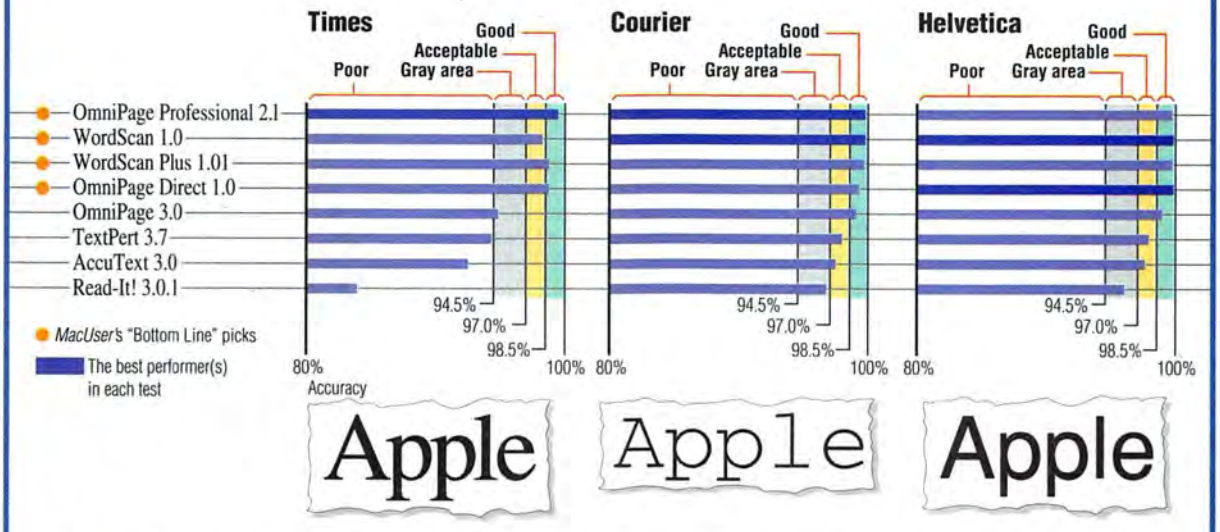



**Figure 6:** We tested the recognition capabilities of our eight OCR packages on a two-page business letter printed in three commonly used fonts — Times, Courier, and Helvetica (all at 10 points).

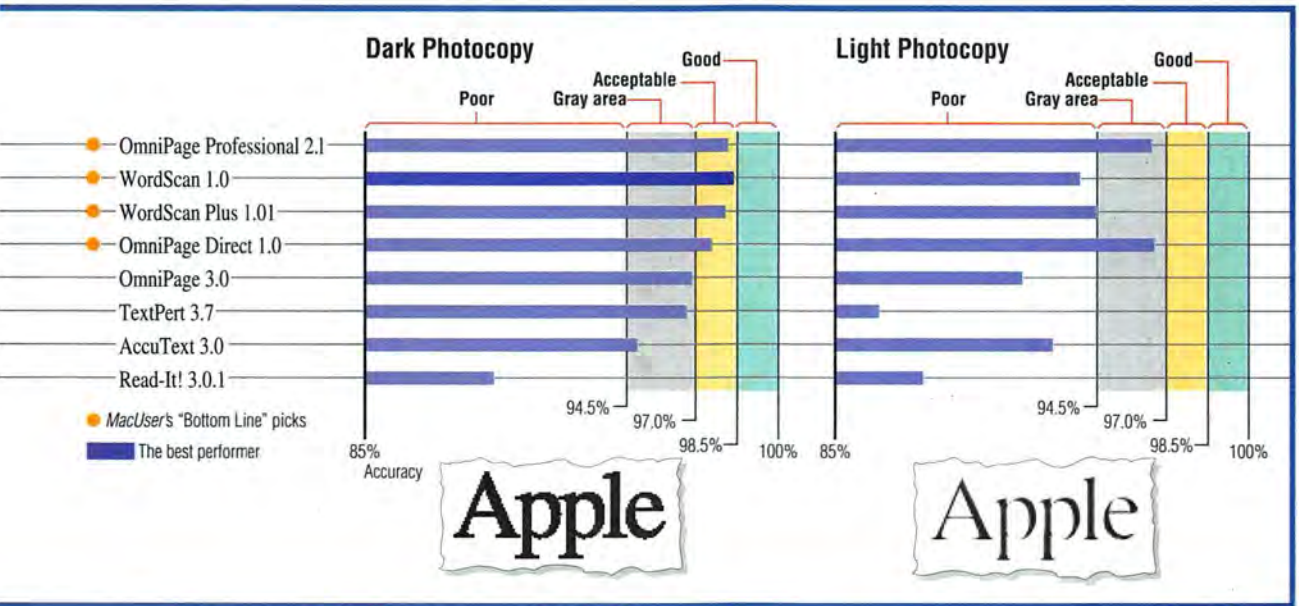
***Times*** challenges an OCR program's recognition capabilities with serifs — the little decorative hooks and knobs that can make letters appear to run together — and variable spacing, which makes the OCR program work harder to locate letters. Half the programs yielded poor or marginal results.

***Courier*** was far easier to recognize. Its *monospaced* design (all letters are the same width) takes some guesswork out of locating letters.

***Helvetica,*** a sans serif font, yielded even better results. All but one program, Read-It!, produced good or acceptable recognition.

can specify a hard-to-recognize or unusual character by double-clicking on the appropriate box in the table; a limited-context bit map then appears, and you can type the character you wish the specified character to be interpreted as. What the manual doesn't tell you is that there is a limit to the number of characters you can add to the set and that the limit varies, depending on available memory.

Read-It! provides a trainable mode,



## Figure 8: Adjust the Fax

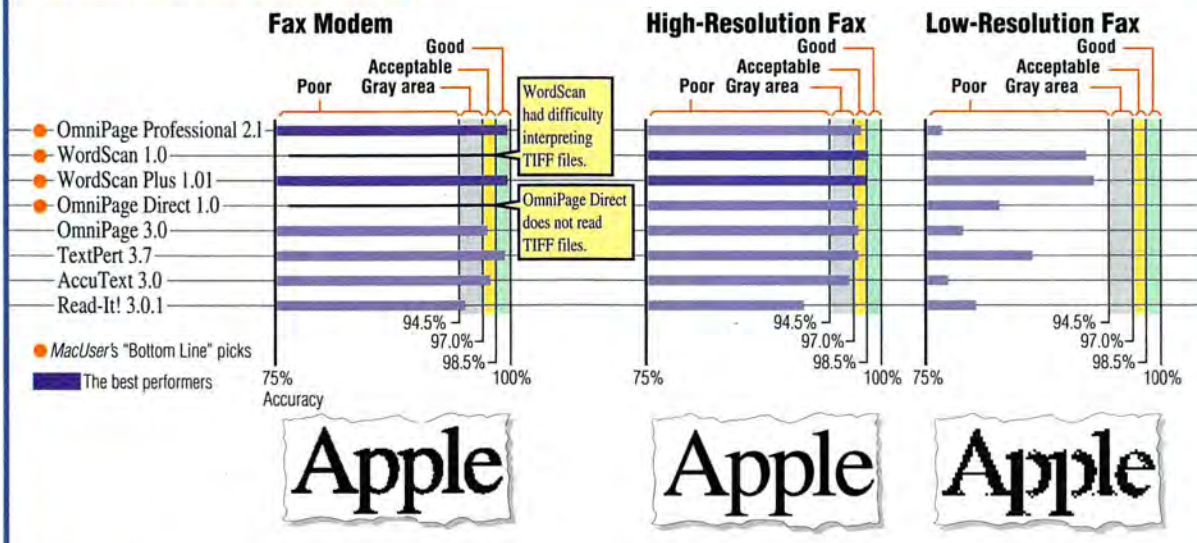



**Figure 8:** The best results were achieved with a fax-modem version of our two-page letter: This involves reading a TIFF file, not a a scanned image. WordScan had difficulties interpreting the TIFF format, so it has no score for this test, and because OmniPage Direct does not read TIFF files, it also has no score. Most of the programs scored in the gray area or the acceptable range on the same letter faxed in high-resolution mode. None of the OCR programs achieved useful results with a fax of the letter sent in normal, or low-resolution, mode.

which is recommended for use if you don't have enough memory (4 megabytes) to run the program in its completely automatic mode. Training is based on type tables: You can edit an existing one or build your own from scratch. The program's training features are not very flexible, however, and once again, the manual provides confusing and sometimes conflicting instructions.

### Try This at Home

We scanned a wide assortment of pages, not just to rate the OCR programs but also to find out what kinds of documents would be good candidates for OCR and which would not. After completing testing, we arrived at an overall performance rating by placing more emphasis on how each OCR program handled such standard documents as business letters, faxes, and photocopies and less emphasis on

## Top Ten OCR Tips

**1.** Use your OCR program's brightness and contrast controls. They can make the difference when dealing with poor-quality material such as faded pages or faxes.

**2.** Always place the printed pages as straight as possible on the scanner bed. Skewed pages contribute to inaccurate OCR.

**3.** Keep the scanner glass clean. Smudges and dirt hinder recognition.

**4.** Keep the scanner lid down. If the lid is even just slightly raised (because you're trying to scan a book), the ambient light leaking in can ruin the scan.

**5.** Cover markings on the page, such as editorial notes, with white paper or 3M Post-it notes so that the scribbles don't confuse the program.

**6.** Organize your scan jobs. If you are scanning a variety of document types, group them and change the settings as necessary to get the best scan. For example, you could group all dot-matrix-printer pages at the end of your pile and enable dot-matrix recognition only for that last stretch.

**7.** Recognize only what you need. It's tempting to let the OCR program recognize the entire page and then open the file in a word-processing application and delete the text you don't need. But you can shorten the OCR processing time by selecting only the text you want recognized.

**8.** Don't scan at high resolutions. It may seem logical to scan at the highest resolution your scanner supports, but be illogical for a change. You can usually attain good accuracy levels by scanning at 200 or 300 rather than 400 dpi.

**9.** Unless you plan to process only a single simple document a week, invest in a flatbed scanner. You may be tempted to save money by buying a hand-held OCR-scanner "solution." You'll be sorry.

**10.** When you're scanning pages printed on thin paper (newsprint, for example), back them with another sheet or two of paper. This helps prevent text printed on the other side from bleeding through and confusing the program.

For a more detailed look at OCR tips and techniques, check out "Speed Reader," in the March '92 issue (page 210).

— Gregory Wasson

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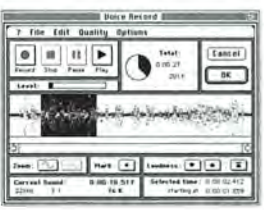


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CIRCLE 106 ON READER SERVICE CARD.

how it handled such challenging documents as spreadsheets, newspaper articles, and multicolumn layouts (see Figure 5).

Straight-text documents such as business letters and press releases are among the most common office documents, so we tested a wide variety of these. The accuracy results for our two-page letter in 10-point Times, 10-point Courier, and 10-point Helvetica appear in Figure 6. These were clean, original documents, and recognition was generally good. Notice that the programs performed better for the monospace Courier and sans serif Helvetica fonts than they did for Times. A font such as Times is more challenging, because it presents serifs and variable character spacing, which can hinder recognition.

If you deal with all sorts of photocopies, you'll need to be selective in choosing which ones to input with OCR. A light photocopy is problematic, because parts of letters can fade away — for example, a capital *O* can be interpreted as *()* or a capital *R* as a capital *K*. OmniPage Professional and OmniPage Direct yielded better results than the other packages in processing a light photocopy, but even at 96-percent accuracy, the text requires a lot of correction. All the products performed better on a dark photocopy (see Figure 7). Making a darker copy of your light photocopy may help you get better results, but this works only up to a point. If holes in letters such as *b, d,* and *g* begin to fill in or if dots and smudges in the background become as prominent as the letters on the page, recognition suffers.

You may want to scan pages received by your office fax machine or your fax modem. No program we tested did well on a letter faxed in normal mode (100 dpi vertically, 200 dpi horizontally). Such low-resolution text produces a lot of broken characters when scanned, which makes it difficult for OCR packages to recognize the letters. WordScan and WordScan Plus had the highest scores, but if you're going to get only 92-percent accuracy, you'd be better off typing the document manually. (See "The Good, the Bad, and the So-So" sidebar for an illustration of percentage-accuracy results.)

When the same letter was faxed in high-resolution mode (200 dpi vertically, 200 dpi horizontally), the higher-resolution image improved recognition substantially. AccuText still fell into the gray area, at 96.48-percent accuracy, but only Read-It! produced less-than-useful results. For a fax-modem document, the overall scores

**Figure 9: Advanced Recognition**

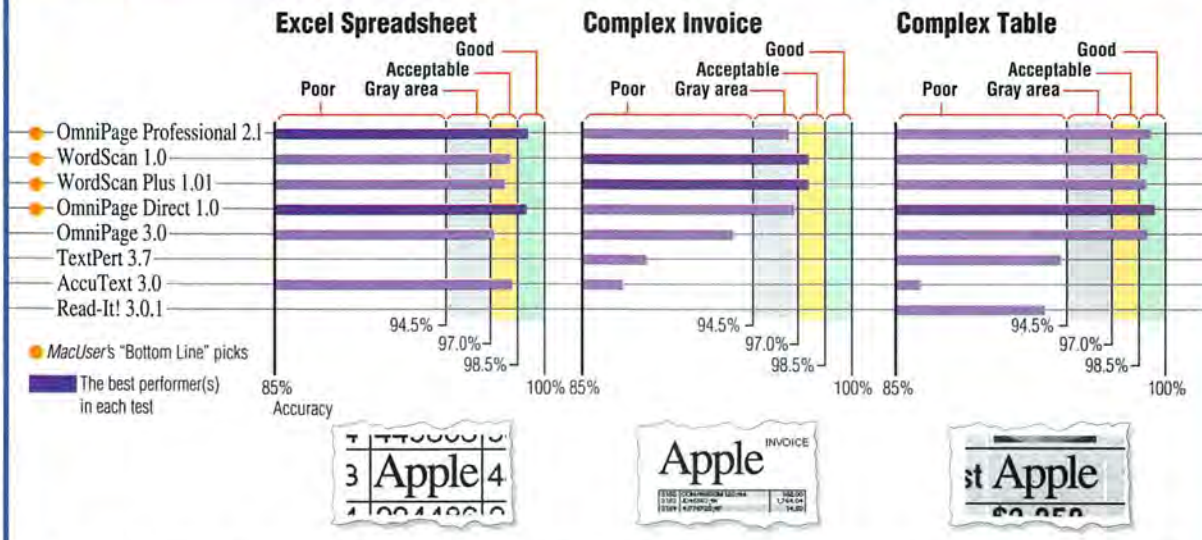



**Figure 9:** Although letters are the most common business documents, you may need to input other information such as spreadsheets, invoices, and tables.

**Excel Spreadsheet:**

A typical single-page spreadsheet in Microsoft Excel produced good or acceptable results. The most-common errors we found were substitutions of the number 1 for the vertical lines separating the columns. Two programs were unable to handle this test: TextPert can't read files scanned in landscape mode, and Read-It! crashed when trying to recognize the scanned file (it can't read any page that contains vertical lines).

**Complex Invoice:**

A complex invoice presented more of a challenge. Our sample included several columns of information, including one with a shaded background. WordScan and WordScan Plus both achieved acceptable results. Read-It! scored 77 percent, too low to appear on this scale.

**Complex Table:**

Our complex table was recognized with surprisingly good results. The poorest score was turned in by AccuText, which had difficulty with the small point size (7-point Helvetica). TextPert and Read-It! also did poorly, but the others scored high marks.

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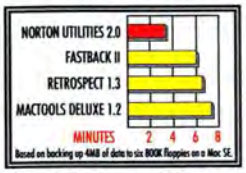
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## The Bottom Line

OCR promises to free you from inputting lengthy documents at your Mac keyboard. But with those promises come errors, perhaps more than you'd commit when typing. Although OCR is far from perfect, several packages offer enough power and flexibility to be worth your investment in time and dollars.

Caere's **OmniPage Professional 2.1** ($995 list, $650 street) and **OmniPage Direct 1.0** ($595 list, $275 street) are among the top performers, turning in good or acceptable results (based on our 97-percent-accuracy cutoff point) for all but a few documents. OmniPage Direct is the easiest to use, because you can access it as a DA from within an open word-processing or spreadsheet application.

Calera's **WordScan 1.0** ($295 list, $189 street) and **WordScan Plus 1.01** ($595 list, $375 street) scored high in terms of percentage accuracy for our test documents. They also were the best at retaining original document formatting, such as tabs and indents. Both programs have a rather clunky user interface, however, and they exhibited a tendency to crash because of problems with their scanner settings. Because of their attractive pricing, we recommend them — but with reservations.




**Caere's OmniPage Direct and OmniPage Professional combine ease of use with good accuracy on a wide variety of documents. Calera's WordScan Plus also rates high in accuracy and format retention but is more difficult to learn.**

were even better, because the programs were reading from an internal TIFF file and not from an optically scanned image. Read-It! was in the gray area of usefulness, with 95.13-percent accuracy. All the other programs that could handle the TIFF format scored 97.5 percent or higher (see Figure 8). Obviously, low-resolution faxes are candidates for the typing pool. (See the "Top Ten OCR Tips" sidebar for other suggestions on improving a program's recognition.)

We also tested the OCR programs with some other challenging documents. Our single-page Excel spreadsheet yielded usable, if not stellar, results with most of the programs. Read-It! and TextPert received no scores for this test, however. Read-It! crashed when we tried to interpret the file (it can't read any page that contains vertical lines), and TextPert can't read files scanned in landscape mode.

We scanned and recognized a complex invoice with a shaded background and columns of numbers and a multicolumn table very like Table 2. The results of our tests with the spreadsheet, invoice, and table appear in Figure 9.

### OCR Can You See?

Look at your documents, look at your keyboard, and think about whether OCR is the answer for you. A few of the products we tested for this report have only limited usefulness. Read-It! scored the lowest overall for accuracy when run in its automatic mode, and its trainable mode presented many stumbling blocks. TextPert managed to produce acceptable results for some types of documents, but it had a tendency to crash while saving. AccuText also performed well for some types of documents, and its trainable mode promises to improve your results, especially for multipage documents. But the program does have a steep learning curve and a fairly stiff price.

Several packages can save you time and effort in the initial steps of inputting documents. Depending on the complexity of your document, you may — no, you *will* — need to spend some time correcting errors, either during recognition; in an editing or verification stage; or after recognition, once you've opened the document in a word-processing or spreadsheet program. But if you input the document manually, you'll spend some time correcting errors too (unless your typing is 100 percent accurate). The choice is yours; you'll find our recommendations in the "Bottom Line" sidebar.

**Elisa M. Welch is a *MacUser* associate editor who appreciates a little recognition.**

*continues* ►

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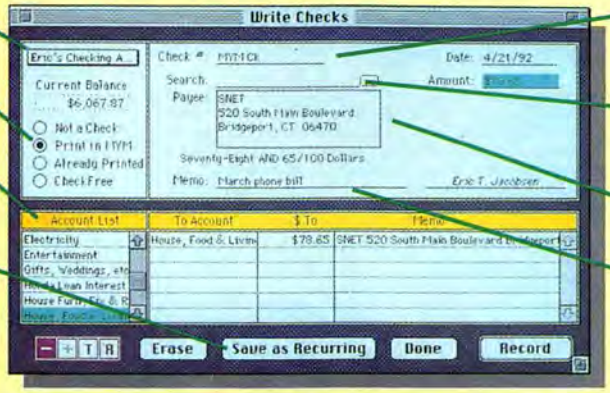
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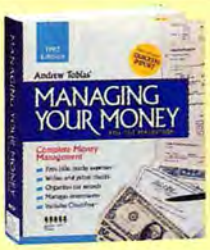



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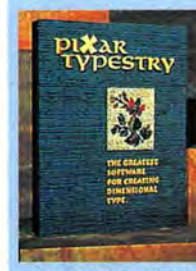



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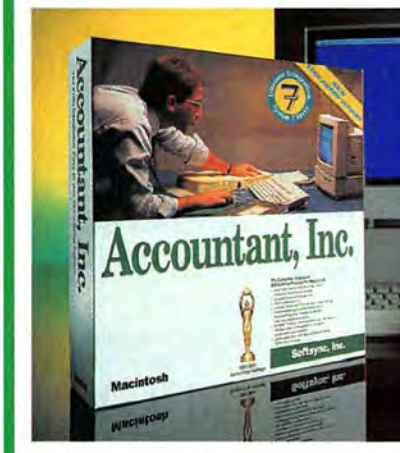
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**Manufacturer: Microtek**
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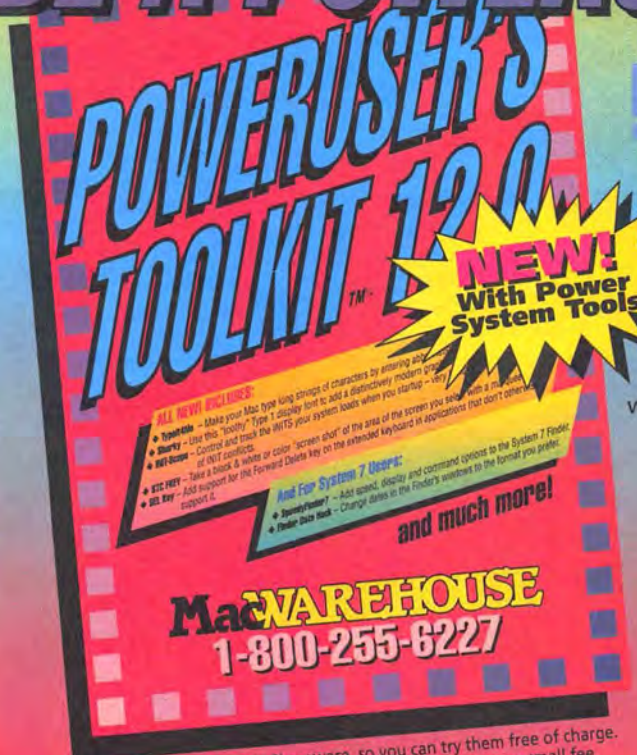
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❼BUS0188 Lotus 1-2-3 for Macintosh ..... 339.
❼SID0004 Lotus 1-2-3 Competitive Upgrade ..... 99.
**Meca**
❼FIN0039 Managing Your Money 5.0 ..... 45.
**Microsoft**
❼BUS0223 Microsoft Excel 4.0 ..... 295.
❼UPG0010 Microsoft Excel 4.0 Upgrade ..... 95.
❼DAT0047 Microsoft FoxBASE+/Mac 2.01 ..... 335.
❼BUS0181 Microsoft Project 3.0 ..... 445.
❼BUS0186 Microsoft Schedule+ 5 Pack ..... 125.
❼BUS0243 Microsoft Works 3.0 ..... 159.
❼BUS0241 The Microsoft Office 2.5 ..... 475.
❼BUS0269 PowerPoint 3.0 ..... 335.
**Occam Research**
❼BUS0233 Muse ..... 469.
**Palo Alto Software**
❼FIN0116 Business Plan ToolKit 4.0 ..... 99.
**Power Up**
❼BUS0153 Address Book Plus 2.0 ..... 63.
❼BUS0073 Calendar Creator ..... 44.
**Round Lake Publishing**
❼Legal LetterWorks or Sales ..... ea. 45.
**Softsync Publishing**
❼FIN0048 Accountant, Inc. 3.0.1 ..... 335.
**Teleware, Inc.**
❼FIN0087 M.Y.O.B. 3.0 ..... 139.
**Visionary Software**
❼BUS0190 First Things First 2.1.2 ..... 45.

### COMMUNICATIONS & NETWORKING

**Apple Computer, Inc.**
❼NET0250 AppleShare 3.0 ..... 969.
❼COM0131AppleTalk Remote Access ..... 159.
❼COM0126Macintosh PC Exchange ..... 69.
**CE Software**
❼COM0101 QuickMail 2.5.1 (1-5 users) ..... 249.
**Dayna Communications, Inc.**
❼NET0125 DaynaPORT E/2 ..... 275.
❼NET0076 DaynaPORT E/SE ..... 149.
**Ex Machina**
❼COM0111Notify! 1.1 Personal Edition ..... 109.
**Farallon™ Computing**
❼NET0007 PhoneNET® Plus, SE & II ..... 31.
❼NET0019 PhoneNET StarController® ..... 899.
❼NET0122 Timbuktu® 4.0.3 ..... 129.
❼NET0034 Timbuktu/Remote® 3.0 ..... 129.
**FreeSoft**
❼COM0060 White Knight V.11 ..... 85.
**Insignia (Full line available)**
❼UTI0174 AccessPC 2.0 ..... 60.
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❼COM0107 Soft PC Universal 2.5 ..... 195.
**Hayes**
❼COM0095HayesConnect 3.0 ..... 75.
**Shiva**
❼NET0246 LANRover/L ..... 599.
**Synergy**
❼COM0003VersaTerm Pro 3.6 ..... 177.
**TechWorks**
❼NET0133 GraceLAN 2.0 50-user ..... 279.
**White Pine Software**
❼COM0114Mac 320-VT320 Emulator ..... 95.

### DESKTOP PUBLISHING

**Aldus**
❼DTP0072 PageMaker 4.2 ..... 495.
❼UPG0003 PageMaker 4.2 Upgrade ..... 99.
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**Quark, Inc.**
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❼DRI0440 Spectrum/8si ..... 539.

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**Artworx**
❼ENT0262 GrailQuest ..... 19.
❼ENT0461 Bridge 7.0 ..... 35.
**Baseline Publishing**
❼ENT0403 Talking Moose/Cartoon Carnival 4.0 ..... 23.
**Broderbund**
❼CDR0042 Just Grandma and Me-CD-ROM ..... 35.
❼GRA0268 Kid Pix 1.2 ..... 35.
**Centron Software, Inc.**
❼ENT0329 BlackJack Strategy Tester/BlackJack Ace ..... 65.
❼ENT0289 CasinoMaster Deluxe Color Version ..... 45.
❼ENT0440 Crossword Creator ..... 39.
**HyperGlot Software Company**
❼Word Torture: Spanish, French, German, Russian ea 35.
**MECC**
❼ENT0381 The Oregon Trail ..... 29.
❼Number Munchers or Word Munchers ..... ea. 19.
**Nordic Software**
❼EDU0276 Word Search Deluxe ..... 35.
❼EDU0142 Preschool Pack 2.0 ..... 35.
**Opcode Systems, Inc.**
❼MUS0107 Audioshop ..... 65.
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❼EDU0355 Stickybear's Reading Room ..... 35.
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❼MUS0105 MusicTime for Mac ..... 169.
**Penton Overseas (Full line available)**
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**Software ToolWorks**
❼MUS0092 Miracle Piano ..... 349.
**XOR Corporation**
❼ENT0274 MacGolf Classic 1.1 ..... 52.
**Zondervan Publishing House**
❼MacBible-Greek or NIV ..... ea.79.
❼BOK0021 MacBible - King James Version ..... 79.

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**Adobe Systems, Inc. (Full line available)**
❼FON0351 Adobe Type On Call 2.0 ..... 59.
❼FON0295 Adobe Type Reunion ..... 41.
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**Font Bank**
FON0438 Postscript Display Typefaces ..... 95.
**Softkey Software**
❼FON0480 KeyForts ..... 49.
**Wayzata Technology**
❼FON0484 Font Fun House CD-ROM ..... 35.

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**Adobe Systems, Inc.**
❼GRA0371 Adobe Premiere 2.0 ..... 439.
❼DTP0054 Illustrator 3.2 (w/ ATM 2.0) ..... 369.
❼GRA0191 PhotoShop 2.0 ..... 549.
**Aldus**
❼GRA0092 Digital Darkroom 2.0 ..... 259.
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❼GRA0131 Super 3D 2.5 ..... 325.
❼HYP0027 SuperCard 1.6 ..... 195.
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**Fractal Design**
❼GRA0323 Painter 1.2 ..... 249.
**Kodak**
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**Specular International**
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**T/Maker**
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**Thought I Could**
❼GRA0302 Wallpaper ..... 37.
**Virtus**
❼GRA0278 Virtus WalkThrough 1.11 ..... 309.

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INP0220 Thumbelina Mac ..... 65.
**Caere**
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**CoStar**
❼INP0196 AddressWriter Envelope Printer ..... 479.
❼INP0194 Stringray Platinum ..... 89.
**Datadesk International**
INP0174 Mac 101E Keyboard Platinum ..... 129.
INP0183 Mac 101E w/Okeys 2 ..... 159.
**Kensington**
❼INP0231 Turbo Mouse (SE or II) 4.0 ..... 109.
❼INP0221 NoteBook KeyPad ..... 99.
**Microtek**
❼INP0246 Microtek ScanMaker II ..... 929.
❼INP0162 TrueLaser Printer ..... 1399.
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❼CHP0074 BookRAM 6S for PowerBook ..... 479.
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❼DRI0500 FastCache Quadra 700/900 ..... 279.
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❼CHP0013 1 Meg SIMMs 100ns ..... 45.
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**PowerUser®**
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❼MOD0043 2400 Mini Modem ..... 89.
**Prometheus**
❼MOD0084 Home Office 24/96 ..... 259.
❼MOD0085 Ultimate Home Office 24/96 ..... 489.

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❼UTI0113 CanOpener 2 ..... 59.
**Advanced Software**
❼UTI0291 InTouch 2.0 ..... 59.
**Aladdin Systems**
❼UTI0302 StuffIt Deluxe 3.0 ..... 69.
❼UTI0303 StuffIt SpaceSaver ..... 35.
**Alsoft**
❼UTI0269 Alsoft Power Utilities Bundle ..... 65.
**Apple Computer, Inc.**
❼LNG0058 AppleTalk For Programmers ..... 219.
❼LNG0057 Mac Programming Fundamentals ..... 449.
❼SYS0004 System 7.1 Personal Upgrade Kit ..... 79.
❼SYS0003 At Ease ..... 55.
**ASD Software, Inc.**
❼UTI0135 FileGuard 2.7 ..... 139.
❼UTI0130 FileGuard 2.7 - Office Pack 5 ..... 479.
**Baseline Publishing**
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❼UTI0183 ScreenShot 1.2 ..... 34.
**Berkeley System Design**
❼UTI0119 After Dark 2.0 ..... 29.
❼UTI0231 More After Dark/ After Dark 2.0 Bundle ..... 45.
**Caere**
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❼UTI0202 OmniPage Professional ..... 649.
**Casa Blanca Works, Inc.**
❼UTI0273 Drive 7 2.2 ..... 49.
**Connectix**
❼UTI0297 CPU Connectix PowerBook Utilities ..... 49.
**Dantz Development**
❼UTI0246 DiskFit Pro ..... 74.
**Fifth Generations**
❼UTI0087 SuitCase 2.1 ..... 55.
**FWB, Inc.**
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**Insight Developement**
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**Kent Marsh**
❼UTI0262 Night Watch II ..... 89.
**MAXA Corporation**
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**Microcom**
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**MicroMat Computer Systems**
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**Nova Development Corporation**
❼UTI0281 Kaboom! ..... 29.
**Now Software**
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❼BUS0212 Now Up-to-Date 2.0 ..... 65.
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❼AutoDoubler 2.0 or DiskDoubler 3.7 ..... ea.59.
**Symantec Corporation**
❼UTI0151 Norton Utilities for the Mac 2.0 ..... 95.
❼UTI0214 Symantec Antivirus for Mac 3.0 (SAM) ..... 65.
**Teknosys**
❼UTI0251 Help 1.02 ..... 89.
**TGS Systems**
❼LNG0053 Prograph 2.5 Compiler Ver. ..... 309.
**UserLand Software, Inc.**
❼UTI0272 UserLand Frontier ..... 189.

### WORD PROCESSING

**Claris**
❼WRD0026 MacWrite II 1.1 ..... 89.
**Microlytics**
❼SPL0017 Word Finder Plus 4.0 ..... 45.
**Microsoft**
❼WRD0059 Word 5.1 ..... 295.
❼UPG0001 Word 5.0 Upgrade ..... 125.
**Softsync Publishing**
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**T/Maker Co.**
❼WRD0051 WriteNow 3.0 ..... 149.
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**Publisher: Dantz Development**
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**Publisher: Fractal Design Corp.**
**Fractal Design Painter**
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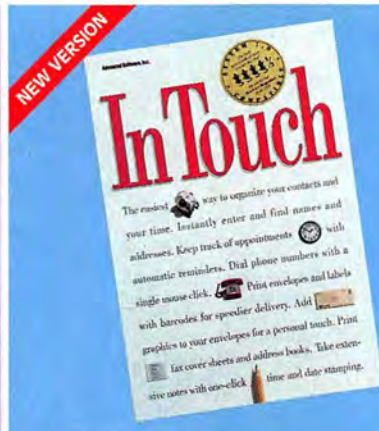
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**BUS0187**

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**Publisher: Advanced Software**
**Also available: *DocuCompII* DTP0081 $99. and *InTouch 2.0 Network-3Pack* UTI0307 $139.**

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**Publisher: ASD Software**

***Single***
**UTI0135**

**$139**

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Included are: Mighty Menus to give you the ability to tear menus from the menu bar of any application; Printer Picker lets you quickly select a network printer without visiting the Chooser; Desktop Extras to make filing files at the finder faster; Super Comments which preserves the Finder "Get info" comments during desktop rebuild, and lets you edit or view them in any application; Trash Alias which prevents orphaned aliases; Helium Pro makes Balloon Help practical and Speed Beep Pro lets you customize your Mac's warning sounds.

**Publisher: Atticus UTI0306**

**$65**

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**Publisher: Microsoft BUS0269**

**$335**




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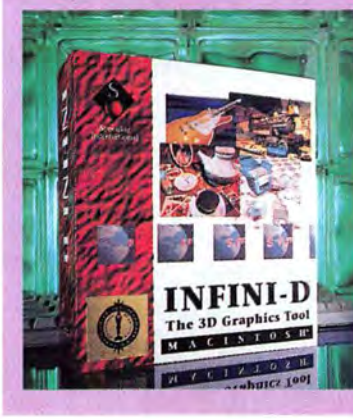



AccuZip6 reduces your mailing costs in every possible way. It corrects, parses, and standardizes every address in your database. Then, it adds Carrier Route Zip+4 and a Postnet BarCode. It uses the database on the included CD-ROM to check addresses for accuracy, so mail intended for NJ won't end up in NH. AccuZip6 also performs presorts for First, Second, and Third class mail, produces all the applicable postal forms, and even prints sack labels.

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**BUS0235**

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**Publisher: Specular International GRA0303**

**$645**

## MacPrint 1.3




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**Publisher: Insight Development**
**UTI0098**

**$95**

## Help! 1.03




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**Publisher: Teknosys**
**UTI0251**

**$89**

## PacerTerm



PacerTerm was designed with your network in mind with multiple TTY, VT102 or VT320 emulation windows connecting over your choice of serial lines, modems, networks and protocols including LAT, and TCP/IP. Once connected, PacerTerm lets you transfer files using ZMODEM, XMODEM, FTP, and Kermit. Powerful HyperTalk scripting with a full function script editor, plus programmable SoftKeys, lets you build flexible, friendly front ends to your host applications. Apple calls it, "Macintosh networking at its best!"

**Publisher: Pacer Software**
**COM0106**

**$159**



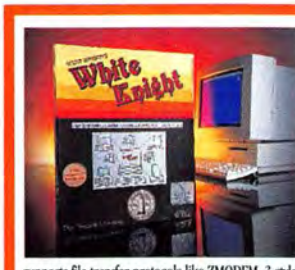

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Work up to three times faster with the best combination of blazing speed and low cost. Its Universal PDS design supports 14 Macs and leaves NuBus slots empty. It's guaranteed 100% compatible running at full speed and doesn't require additional memory. Rated as the best accelerator by leading industry editors, the PowerCache is always upgradable to any future DayStar products. Choose the board you need to get the speed you want.

**Manufacturer: DayStar Digital**
**DRI0467** ***Universal Powercache 40 w/o 68882***
*Full line available.*

**$839**

## White Knight V.11




Winner of 11 awards, White Knight will give you powerful, painless communications at an affordable price. Geared to all levels of experience, it supports file transfer protocols like ZMODEM, 3 styles of YMODEM, Flash & 3 styles of Kermit. Terminal emulation supports TTY, VT52, VT100 & VT102 as well as 32 bit color QuickDraw & large monitors. Comes with a FREE copy of Okyto (a revolutionary, new Mac-to-Mac file transfer program & $39.95 value).

**Publisher: FreeSoft COM0060**

**$85**

## COPYright




COPYright is a transparent utility that completely replaces the Finder's copy function, enabling users to copy files and folders in the background, and still perform all Finder functions (launch applications, delete files, etc.). It also means copy protection of a different kind by keeping a log of all copies to and from a Macintosh and is the first file copying utility that helps you track all copying traffic.

**Publisher: CSG Technologies**
**UTI0320**

**$35**

## TouchBASE/DateBook Bundle-with Redux FREE!

Schedule, organize and save with the TouchBASE/DateBook Bundle. TouchBASE lets you to store information about personal and business contacts, alternative phone numbers, plus customize the fields. Also allows you to prints envelopes and mailing labels, including postal barcodes, and fax sheets covers. DateBook is the ultimate personal time manager for Macintosh. Instant access and advanced scheduling keeps you on top of your appointments and things to do. Shows your schedule in multiple formats including test, Gantt chart and time bar. DateBook's views enable you to see your schedule quickly in as much detail as you like. ***TouchBASE/DateBook bundle comes with FREE Redux, a quick and easy backup utility!***




**Publisher: After Hours Software**
**BND0150**

**$99**

# POWER USER SIMMS ONLY

# $49*

Due to federal tariffs imposed on SIMMs, prices may vary significantly. Please call for the latest prices and availability.

**FREE!** STEP-BY- STEP VIDEO INSTRUCTIONS**



**A Power User Memory Expansion Kit will dramatically increase the power of your Mac.** And our fast, reliable overnight service will have your Kit in your hands tomorrow!

## MORE BRAIN POWER FOR YOUR MAC

Never again will you have to quit your word processor just to answer a question about a spreadsheet. Install extra memory and you can leave a letter open while you refer to last month's sales figures.

You can edit those monstrous scanner files with advanced graphics applications or develop your own custom HyperCard stacks. More memory means more power at your fingertips.

## PLUG IN INSTALLATION

Adding memory doesn't require technicians in lab coats. You'll find installation at home easy when you follow our FREE** step-by-step installation video instructions. Just open your Mac, slide out the main circuit board and plug in your SIMMs.

## WHAT DO I NEED?

Our helpful sales and technical staff is standing by to answer any questions and take the mystery out of memory upgrades. Memory cards come with one megabyte on each card and are usually sold in pairs — (2 @ $49 ea.)

The chart explains exactly what you need to achieve the desired level of performance.

To open your Mac Plus, SE, and Classics you'll need a specially designed tool — it's available from us as part of a handy tool kit for just $9.

## WHAT YOU NEED TO KNOW

Memory chips come factory-installed on plug-in cards, called SIMMs (Single Inline Memory Modules). Each one megabyte SIMMs card holds eight top quality, memory chips. We carry chips by all the major manufacturers like Texas Instruments, Intel and Samsung.

Prices can vary a lot, based on quality, speed and demand. At press time our price for 1MB, 120ns SIMMs is $49.

Please call for the very latest prices and availability. Our sales staff will tell you what you need and help you make your choice an easy one.

| To upgrade a 4-socket Mac Plus or SE to this amount of memory | Do this: (Install in multiples of two only) SIMMs must be 150ns or faster |
|---|---|
| 2 MB | Remove all four existing 256k SIMMs, install two 1 MB Simms, leave two sockets for future expansion. |
| 2-1/2 MB | Remove only two 256k SIMMs, install two 1 MB SIMMs. |
| 4 MB | Replace all four 256k SIMMs with four 1 MB SIMMs. |
| **To upgrade a 2-socket Mac Classic II or LC to this amount of memory** | **Do this: (Install in multiples of two only) SIMMs must be 100ns or faster** |
| 4 MB | Install two 1 MB SIMMs |
| **To upgrade a 2-socket Mac LC II to this amount of memory** | **Do this: (Install in multiples of two only) SIMMs must be 100ns or faster** |
| 6 MB | Install two 1 MB SIMMs. |
| **To upgrade a 8-socket Mac II, IIx, IIci, IIcx or SE/30 to this amount of memory** | **Do this: (Install in multiples of four only) SIMMs must be 120ns or faster** |
| 4 MB | Remove all four existing 256k SIMMs, install four 1 MB SIMMs, leave remaining sockets for future expansion. |
| 5 MB | Keep existing 256k SIMMs, install four 1 MB in remaining sockets. |
| 8 MB | Remove all four 256k SIMMs, install eight 1MB SIMMs |
| **To upgrade a 4-socket Mac IIsi to this amount of memory** | **Do this: (Install in multiples of four only) SIMMs must be 100ns or faster** |
| 5 MB | Install four 1 MB SIMMs. |
| **To upgrade a 4-socket Quadra 700 to this amount of memory** | **Do this: (Install in multiples of four only) SIMMs must be 80ns or faster** |
| 8 MB | Install four 1MB SIMMs. |
| **To upgrade a 16-socket Quadra 900 to this amount of memory** | **Do this: (Install in multiples of four only) SIMMs must be 80ns or faster** |
| 4 MB | Install four 1MB SIMMs. |
| 8 MB | Install eight 1MB SIMMs. |
| 12 MB | Install twelve 1MB SIMMs. |

## SPEED

Do you need 80, 100 or 120 Nanosecond (ns) chips? Nanoseconds are billionths of a second, so an 80 ns chip responds faster than a 100ns chip. The original Mac used relatively slow 150ns memory chips. The 68020 processor needs 120ns (or faster) chip, and the 68030 Macs like the speedier model.

## OVERNIGHT DELIVERY

Install a MacWarehouse Expansion Kit and working with your Mac will never be the same! Call us now. We'll help you select just the right Memory Upgrade, and we'll ship it overnight for just $3.

CHP 0012 120ns SIMMs.....$49

MacWAREHOUSE®

**1-800-255-6227**

**Overnight Delivery Only $3.00!**

Call 24 hours a day, 7 days a week

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### MACWAREHOUSE 30-DAY MONEY BACK GUARANTEE

If, for any reason, you are dissatisfied with your Power User Memory Kit, you may return it for a full refund within thirty days of purchase. All you have to do is call us for a return authorization number and return this product, postage paid, in its original condition, with the original packaging and documentation.

### TWO YEAR WARRANTY.

MacWarehouse also guarantees its Memory Kits against manufacturer defects for two years from the date of purchase. We will repair the item or replace it at our discretion.

MU0193

* SIMMs prices vary. Call for latest information.
** Limited Offer! Free video with purchase of 2 or more SIMMs.

CIRCLE 156 ON READER SERVICE CARD.

## Table 2: Features of OCR Software

| ● = yes<br>○ = no | <br>AccuText 3.0<br>$$$ | <br>OmniPage 3.0<br>$$$½ | <br>OmniPage Direct 1.0<br>$$$$ |
|---|---|---|---|
| **List price** | $995 | $695 | $595 |
| **Street price** | $675 | $475 | $275 |
| **Pros** | Reasonable accuracy. Flexible training features. | Easy to use. Good manuals. Reasonable accuracy. | Easiest to use. Consistent high accuracy for tested documents. |
| **Cons** | Difficult user interface. Expensive. | Poor format retention. No training capabilities. | Unable to read TIFF files. No training capabilities. |
| **Specifications** | | | |
| Size of main application | 577K | 1 MB | 1.5 MB |
| Minimum system version | 6.0.2 | 6.0 | 7 |
| Minimum memory | 4 – 5 MB | 4 MB | 4 MB |
| Recommended memory | 4 – 5 MB | 4 MB | 4 MB |
| Minimum hard-disk space | 2 MB | 4 MB | 4 MB |
| Mac models supported | SE/30, II or later, Quadra | SE/30, II or later | II or later |
| **Input compatibility/support** | | | |
| Nonscanned-image formats | MacPaint, PICT, TIFF | TIFF | none |
| Automatic document feeder | ● | ● | ● |
| **Output compatibility/support** | | | |
| Word-processing formats | MacWrite, MacWrite II, RTF, SylkWingZ, Word, WordPerfect | ASCII, MacWrite, RTF, Word, WordPerfect | any program via Clipboard |
| Spreadsheet formats | Excel, WingZ | Excel | any program via Clipboard |
| Other formats | HyperCard | none | any program via Clipboard |
| **View options** | | | |
| Text-editing window | ○ | ● | ○ |
| Pop-up bit map | ● | ○ | ○ |
| **Recognition options** | | | |
| Orientations supported | portrait, landscape, upside-down | portrait, landscape, upside-down | portrait, landscape, upside-down |
| Font sizes recognized | 8 – 24 points | 6 – 72 points | 6 – 72 points |
| Style recognition | ● | ● | ● |
| User-definable recognition order | ● | ● | ● |
| Deferred batch recognition | ● | ● | ○ |
| Background recognition | ● | ○ | ○ |
| Trainable mode | ● | ○ | ○ |
| **Proofing options** | | | |
| Spelling checker | auto | auto, manual | none |
| User dictionaries | ● | ● | ○ |
| **Company** | Xerox Imaging Systems<br>9 Centennial Dr.<br>Peabody, MA 01960<br>800-248-6550<br>508-977-2000<br>508-977-2148 (fax) | Caere Corp.<br>100 Cooper Ct.<br>Los Gatos, CA 95030<br>800-535-7226<br>408-395-7000<br>408-354-2743 (fax) | Caere Corp.<br>100 Cooper Ct.<br>Los Gatos, CA 95030<br>800-535-7226<br>408-395-7000<br>408-354-2743 (fax) |

# Just Say No



*Fast, Error-Free Programming; Reduce Application Development Time By Two Orders Of Magnitude.*

If it bugs you to spend more time stamping out syntax errors than building applications, it's time you discovered the benefits of on-the-fly debugging with Prograph, and the excitement of not having to worry about syntax. Prograph 2.5™ is today's most advanced object-oriented development system for the Macintosh. Its graphical interface combines the power of a low-level coding language like C with the fresh new approach of a high-level "visual language" like Prograph. Instead of drudging out endless lines of code, you simply program by pointing, clicking and naming. And you'll never wrestle with syntax errors again, because Prograph simply will not let you make them. With Prograph, all your Mac applications are easy to write, easy to change and easy to maintain. Prograph's integrated interpreter, compiler and debugging tools let you design, execute and test subroutines on demand, without having to complete a full application. And you don't have to spend time specifying variable data types, because your data flows from object to object. If you develop Macintosh applications for a living, get Prograph in - and get the bugs out.




*"We heartily recommend it to in-house corporate programmers who need to develop custom applications quickly"* ★★★★

MacUser, October 1992

TGSSystems

CIRCLE 132 ON READER SERVICE CARD.

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## Table 2: Features of OCR Software, continued

| ● = yes<br>○ = no |  OmniPage Professional 2.1<br>♦♦♦♦ |  Read-It! 3.0.1<br>♦♦ |  TextPert 3.7<br>♦♦½ |
|---|---|---|---|
| **List price** | $995 | $595 | $495 |
| **Street price** | $650 | $300 | $325 |
| **Pros** | Easy to use. Good manuals. Consistent high accuracy for tested documents. | | |
| **Cons** | Expensive. Poor format retention. | Poor manual. Difficult to use. Poor accuracy. | Prone to crashing. Poor manual. Poor accuracy. No training capabilities. |
| **Specifications** | | | |
| Size of main application | 1.8 MB | 476K | 809K |
| Minimum system version | 7 | 6.0.5 | 6.0.3 |
| Minimum memory | 5 MB | 1 MB | 1 MB |
| Recommended memory | 8 MB | 4 MB | 2 MB |
| Minimum hard-disk space | 8 MB | 5 MB | 2.5 MB |
| Mac models supported | II or later | Plus, Classic, SE, SE/30, LC, II or later | Plus or later |
| **Input compatibility/support** | | | |
| Nonscanned-image formats | TIFF | PICT, TIFF | TIFF |
| Automatic document feeder | ● | ● | ● |
| **Output compatibility/support** | | | |
| Word-processing formats | ASCII, MacWrite, MacWrite II, RTF, Word, WordPerfect | MacWrite, MacWrite II, Word, Works, WriteNow | ASCII, MacWrite, Word |
| Spreadsheet formats | Excel | Excel | none |
| Other formats | none | none | none |
| **View options** | | | |
| Text-editing window | ● | ● | ● |
| Pop-up bit map | ● | ● | ● |
| **Recognition options** | | | |
| Orientations supported | portrait, landscape, upside-down | portrait, landscape | portrait |
| Font sizes recognized | 6 – 72 points | 6 – 72 points | 6 – 72 points |
| Style recognition | ● | ○ | ○ |
| User-definable recognition order | ● | ● | ● |
| Deferred batch recognition | ● | ● | ● |
| Background recognition | ○ | ● | ○ |
| Trainable mode | ● | ● | ○ |
| **Proofing options** | | | |
| Spelling checker | auto, manual | auto | ○ |
| User dictionaries | ● | ● | ○ |
| **Company** | Caere Corp.<br>100 Cooper Ct.<br>Los Gatos, CA 95030<br>800-535-7226<br>408-395-7000<br>408-354-2743 (fax) | Olduvai Corp.<br>7520 Red Rd., Ste. A<br>South Miami, FL 33143<br>800-822-0772<br>305-665-4665<br>305-665-0671 (fax) | CTA, Inc.<br>25 Science Park<br>New Haven, CT 06511<br>800-242-1552<br>203-786-5828<br>203-786-5833 (fax) |

# What Makes Our 11x17 Printer Better Than The Rest?




## 600 dpi, 800 dpi, 960 dpi, Speed, Flexibility, Upgradability and Support... oh yeah, Price.

When shopping for an 11x17 PostScript® compatible printer, we realize you have a lot of choices. And while many vendors lay claim to being the best, Xante prefers to leave the judging to you. We invite you to compare our printer with the rest. With the *Accel-a-Writer 8100*, you'll get...

**11x17/A3 Printing** - The large page size support will give you a new level of flexibility in page layout and printing.

**True High Resolution** - The *Accel-a-Writer 8100* supports true 600 x 600 dpi for incredibly sharp text and graphics. And you have the option to nearly double or triple the resolution with our 800 x 800 dpi and 960 x 960 dpi upgrades.

**High Speed Printing** - The *Accel-a-Writer 8100* is built for speed with the AMD 29000 RISC processor, 12 MB RAM, Xante's *Advanced Memory Management*, and Canon®'s 8 page per minute LBP®-BX laser print engine.

**Flexibility** - Sharing among Mac® and PC users is simple with simultaneously active AppleTalk®, Parallel and Serial interfaces. You'll get font flexibility with 35 Type 1 fonts plus the ability to download up to 30 more permanently on the controller with Xante's *Virtual Disk Technology*.

Quality Assurance Guarantee

**Best Price** - The *Accel-a-Writer 8100* gives the highest quality in output, advanced printing technology and flexibility. But the best thing is you won't have to pay a premium. In fact, the *Accel-a-Writer 8100* is only $3,995.

**Quality Assurance Guarantee** - Your purchase will be protected with toll-free customer support, a one year warranty and a 30-day unconditional money back guarantee. Compare, then call us directly.

| | Accel-a-Writer™ 8100 | CalComp® CCL-600 | NewGen® TurboPS 660™ B | QMS® 860 Print System |
|---|---|---|---|---|
| Standard Resolution | 600x600 dpi | 600x600 dpi | 600x600 dpi | 600x600 dpi |
| Optional Resolution | 800 & 960 dpi | None | 800 dpi | None |
| Standard RAM | 12 MB | 2 MB | 12 MB | 12 MB |
| Virtual Disk Technology | ✓ | | | |
| Enhanced Gray Scale | ✓ | | | |
| Price | $3,995 | $3,995 | $5,495 | $4,595 |

Statistics as of 10/92

**1-800-926-8839**
Ext. 2201
Fax 205-476-9421

XANTE
*Innovations In Output*

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CIRCLE 224 ON READER SERVICE CARD.

# Winning Co



**Baseball and hotdogs**



**Mom and apple pie**

**Every business needs "recognition."** Caere® and Hewlett-Packard have joined forces again. It's hard to imagine HP's award-winning scanners without equally great page recognition software. Kind of like peanut butter without jelly. Mom without her apple pie. Or Peter and Paul without Mary.

HP and Caere let you put your best image forward, whatever your business or profession, allowing you to enter text, numbers or graphics directly into your Macintosh® without a single keystroke. It's like having a personal assistant to type reports or prepare graphics for key presentations around the clock.

**A combination to match your need.** And now you can choose from two winning combinations to match your own *unique* set of needs.

Choose *OmniPage* Direct and the HP ScanJet IIp scanner for the Mac, the ideal solution if you happen to be an independent business person, or consultant, and require a powerful option at the most affordable price. Within minutes you'll be up and running, entering text and graphics of all sorts – directly into your favorite word processor, spreadsheet or page layout program. All without a hitch.

Or consider the world's most advanced page recognition solution, *OmniPage* Professional and the HP ScanJet IIc scanner for the Mac. This is the right choice if you require state-of-the-art capabilities, along with the world's most accurate and customizable OCR, 400 dpi text and images, as well as grayscale and 24-bit color.

# mbinations




**The HP ScanJet IIp scanner and OmniPage Direct**




**OmniPage Professional and the HP ScanJet IIc scanner**

## It pays to get recognized.

Now you can have the best for less with an HP "Fame and Fortune" rebate and a *bonus* money saving offer from Caere. If you own a small business and need to increase your productivity right away, save up to $100 when you buy the HP ScanJet IIp scanner for the Mac and *OmniPage* Direct. If you require the "industrial strength" page recognition solution – one that can tackle even coffee soaked memos, reams of paper, or documents – buy the HP ScanJet IIc scanner for the Mac and *OmniPage* Professional and save up to $200!

## Now is your chance at "Fame & Fortune."

Buy *OmniPage* Direct and the HP ScanJet IIp scanner for the Mac now and get $50 from Caere and $50 from HP!

Buy *OmniPage* Professional and the HP ScanJet IIc scanner for the Mac now and get $100 from Caere and $100 from HP!

**Call Caere at 1-800-535-SCAN**

**Call HP at 1-800-35HPMAC, ext. 7141**

*Offer valid through January 31, 1993.*

CAERE®

HEWLETT PACKARD

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## Table 2: Features of OCR Software, continued

| ● = yes<br>○ = no | <br>WordScan 1.0<br>$$$½ | <br>WordScan Plus 1.01<br>$$$½ |
|---|---|---|
| **List price** | $295 | $595 |
| **Street price** | $189 | $375 |
| **Pros** | High accuracy ratings on test documents. Good format retention. | High accuracy ratings on test documents. Good format retention. |
| **Cons** | Scanner-control problems. No training capabilities. | Scanner-control problems. No training capabilities. |
| **Specifications** | | |
| Size of main application | 2.4 MB | 2.6 MB |
| Minimum system version | 6.0.5 | 6.0.5 |
| Minimum memory | 3 – 4 MB | 3 – 4 MB |
| Recommended memory | 3 – 4 MB | 3 – 4 MB |
| Minimum hard-disk space | 6 MB | 6 MB |
| Mac models supported | Plus, Classic, SE, SE/30, Portable, LC, II or later | Plus, Classic, SE, SE/30, Portable, LC, II or later |
| **Input compatibility/support** | | |
| Nonscanned-image formats | PDA, PICT, TIFF | PDA, PICT, TIFF |
| Automatic document feeder | ● | ● |
| **Output compatibility/support** | | |
| Word-processing formats | FullWrite, MacWrite, MacWrite II, Word, WordPerfect, WriteNow | MacWrite, Word, WordPerfect, WriteNow |
| Spreadsheet formats | Excel, WingZ | Excel, WingZ |
| Other formats | FrameMaker, PageMaker, QuarkXPress | FrameMaker, PageMaker, QuarkXPress |
| **View options** | | |
| Text-editing window | ● | ● |
| Pop-up bit map | ○ | ● |
| **Recognition options** | | |
| Orientations supported | portrait, landscape, upside-down | portrait, landscape, upside-down |
| Font sizes recognized | 6 – 34 points | 6 – 34 points |
| Style recognition | ● | ● |
| User-definable recognition order | ○ | ● |
| Deferred batch recognition | ● | ● |
| Background recognition | ● | ● |
| Trainable mode | ○ | ○ |
| **Proofing options** | | |
| Spelling checker | manual | auto |
| User dictionaries | ● | ● |
| **Company** | Calera Recognition Systems<br>475 Potrero Ave.<br>Sunnyvale, CA 94086<br>800-544-7051<br>408-720-0999<br>408-720-1330 (fax) | Calera Recognition Systems<br>475 Potrero Ave.<br>Sunnyvale, CA 94086<br>800-544-7051<br>408-720-0999<br>408-720-1330 (fax) |

## Table 2 Criteria

**List price** — The vendor's suggested retail price.

**Street price** — The price of the software through mail order or through dealers surveyed across the U.S. in August 1992.

**Nonscanned-image formats** — The image formats the software can import from sources other than a scanner.

**Automatic document feeder** — A yes means the software supports scanning with an automatic document feeder; a no means pages must be placed manually on the scanner bed.

**Word-processing formats** — The word-processing applications to which recognized text can be exported.

**Spreadsheet formats** — The spreadsheet applications to which recognized text can be exported.

**Other formats** — Other applications, such as database managers or page-layout programs, to which text can be exported.

**Text-editing window** — Does the software provide a window for editing text before export to another application?

**Pop-up bit map** — Is a bit map of the scanned image provided so you can compare text with the characters in the scan?

**Orientations supported** — The ways in which a page can be oriented in the scanner: portrait, landscape, or upside-down.

**Style recognition** — Does the program recognize and retain bold and italic type?

**User-definable recognition order** — Can you choose the order in which the text zones are recognized?

**Background recognition** — Can the program perform recognition in the background while you run another application?

**Trainable mode** — Can you teach the program to interpret selected scanned bit maps as characters you specify?

**Spelling checker** — Whether the program offers internal automatic and/or manual spell checking before text is exported to another application.

**User dictionaries** — Does the program support user-edited dictionaries in its internal spell checking?

# •From Mac to Film•

From the Mackintosh Desktop to Film, PrePRESS DIRECT!, has the product and knowledge to bring your prepress applications in house. With the all new Varityper 2990 Color Publishing System (based on the Macintosh Quadra 950), to the Varityper 4990A Imagesetter we make in house prepress.affordable and easy. Since electronic publishing is the only market we serve our sales consultants understand your prepress questions and are able to provide you with informed response. One source for all your electronic prepress applications.... PrePRESS *DIRECT!*

## 2990 Color Publishing System

The Varityper 2990A and 2990B are entry-level systems that are capable of high-quality color production and are ideal for use in the preparation of sales promotion materials, pamphlets, brochures, annual reports, and other printed matter.



### 2990A Color Publishing System

Macintosh Quadra 950 with:

- 33 MHz 68040 processor
- 515 MB Internal Hard Drive
- 44 MB Internal SyQuest
- 36 MB of RAM
- 24 Bit Accelerated Video Interface
- Extended Keyboard
- 16" Color Monitor
- Varityper Color Management System
- VariColor™ Publishing System Software Package **$20,495**

### 2990A/4990A System Bundle

From Mac to film with a comprehensive package:

- 2990A Color Publishing System
- 4990A PostScript™ Imagesetter
- BarneyScan CIS•3515 Color Scanner
- BarneyScan CIS•Color Access Software
- Sharp JX-600 reflection scanner
- 7140 Film Processor **$69,995***

*Price includes Installation, Training, Annual Service and HelpLine Contracts.

## Macintosh Hard Drives & Opticals

| | |
|---|---|
| **PLI** | |
| SyQuest 44 with cartridge | **$ 599** |
| SyQuest 88 with cartridge | **699** |
| 3.5 Sony Optical-130 MegaByte | **1,599** |
| 5.25 Sony Optical-650 MegaByte | **2,999** |
| MaxOptical -1 GigaByte | **3,599** |
| External 240 MegaByte Fast SCSI-2 | **919** |
| External 330 MegaByte Fast SCSI-2 | **1,349** |
| External 425 MegaByte Fast SCSI-2 | **1,599** |
| External 520 MegaByte Fast SCSI-2 | **1,699** |
| External 1.0 GB Fast SCSI | **2,199** |
| External 2.1 GB Fast SCSI-2 | **4,995** |
| **MicroNet Raven 040 Arrays** | |
| 1030 MB Internal | **2,899** |
| 2024 MB Internal | **4,099** |
| 4060 MB Internal/External | **8,999** |

Please call for pricing on other fine products from MicroNet

## Blank Opticals & Syquests

| | |
|---|---|
| SyQuest 44 MegaByte | **$ 79** |
| SyQuest 88 MegaByte | **119** |
| Optical 130 (3.5") MegaByte | **55** |
| Optical 650 (5.25") MegaByte | **129** |

## Printers

| | |
|---|---|
| **QMS** | |
| ColorScript 210/230 | **Call for pricing** |
| Hammerhead 860 | **Call for pricing** |
| **SuperMac** | |
| Positive Proof System | **Call for pricing** |
| Positive Proof System | **Call for pricing** |
| **RasterOps** | |
| CorrectPrint 300 with 36 MegaByte | **$9,995** |
| **Tektronix** | |
| Phaser III PXi with14 MegaByte & Extra color sticks | **$9,995** |
| **Varityper** | |
| VT-400 Tabloid Printer-35 fonts | **3,099** |
| VT-400 with font drive(70 font total) | **3,799** |

## Scanners

| | |
|---|---|
| **Microtek** | |
| ScanMaker 1850 | **$1,849** |
| **Optronics** | |
| ColorGetter II | **Call for pricing** |
| **Sharp** | |
| JX-610 | **Call for pricing** |
| **Truvel** | |
| 3D Scanner | **Call for pricing** |
| **UMAX** | |
| UC-630 (300x600 dpi) | **$1,299** |
| UC-1200S (600x1200 dpi) | **3,295** |
| UMAX Transparency option | **739** |

## Monitors

| | |
|---|---|
| **SuperMac** | |
| 20" Color SuperMatch | **$1,799** |
| 21" Color SuperMatch | **2,699** |
| Spectrum 8•24 PDQ | **879** |
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# High-Resolution Printers

**Three low-cost printers set a new standard for high resolution — at speeds faster than those of Apple's IINTX.**



**Figure 1: Three new fast and affordable 600-dpi printers (left to right): the NewGen TurboPS/660, the Xante Accel-a-Writer 8000, and the Lexmark IBM LaserPrinter 10A.**

The desktop-printing and -publishing revolution began in 1986, when Apple introduced the 300-dpi PostScript LaserWriter. Although 300-dpi output was immediately endorsed for most business uses, desktop publishers who wanted higher-resolution output were forced to pay a premium price for slower printers (see "Practically Perfect Printing: High-Resolution PostScript Printers," February '92, page 172) — until recently.

Now there's a second revolution brewing. This month, MacUser Labs looks at three 600-dpi PostScript laser printers — the Lexmark IBM LaserPrinter 10A, the NewGen TurboPS/660, and the Xante Accel-a-Writer 8000 — that not only produce better output than 300-dpi printers but also accomplish this in less time. At list prices of less than $4,000, these three fast, low-cost printers are harbingers of a new breed of desktop printers — and the high-resolution news is about to get even better.




**When we wrote our February '92 report, high-resolution printers were slower and more expensive than 300-dpi printers.**

### Good Looks, Good Speed

The move to high-resolution printing is driven by the desire for good image quality — text that isn't jaggy, fine lines that are truly fine, and continuous-tone images that aren't fuzzy. Our jury of desktop-publishing experts judged the NewGen TurboPS/660 to have the best output for text and fine lines (see Figure 2). Although the Xante

**Table 1: Pros and Cons**

| | Lexmark IBM LaserPrinter 10A ★★½ | NewGen TurboPS/660 ★★★★ | Xante Accel-a-Writer 8000 ★★★½ |
|---|---|---|---|
| List price | $3,995 | $3,795 | $3,995 |
| Street price | $3,150 | $2,795 | $3,995 |
| Pros | True 600-dpi engine. Optional 500-sheet paper tray for two-tray operation. | Best text quality. Inexpensive. Auto-switching and simultaneously active ports. | Fastest. Auto-switching and simultaneously active ports. Best halftone image quality. |
| Cons | Slow processor. | Coarse halftone quality. | Expensive. |
| Company | Lexmark International, Inc.<br>740 New Circle Rd.<br>Lexington, KY 40511<br>800-358-5835<br>606-232-2000<br>606-232-5439 (fax) | NewGen Systems Corp.<br>17580 Newhope St.<br>Fountain Valley, CA 92708<br>800-756-0556<br>714-641-8600<br>714-641-2800 (fax) | Xante Corp.<br>2559 Emogene St.<br>Mobile, AL 36606<br>800-926-8839<br>205-476-8189<br>205-476-9421 (fax) |

PHOTOGRAPHY: STAN MUSILEK

Accel-a-Writer 8000's smaller-sized text wasn't as crisp as that of the other two printers, its gray-scale images were judged the best of the bunch.

Despite having to process four times as much information, the Accel-a-Writer 8000 and TurboPS/660 are each faster than the 300-dpi LaserWriter IINTX — the Accel-a-Writer 8000 is nearly one and a half times as fast (see Figure 3). Although both printers use the same 8-ppm (page per minute) Canon SX engine as the LaserWriter IINTX, they each employ fast RISC (reduced-instruction-set computing) processors to speed print-preparation time. The Lexmark IBM LaserPrinter 10A sports a 10-ppm engine, but it performed poorly, due to its slow 16.7-megahertz 68020 processor — the same processor that's in the LaserWriter IINTX.

### On the Horizon

Engineers at NewGen and Xante had to use electronic enhancements to emulate 600-dpi resolution; on the other hand, the Lexmark IBM LaserPrinter 10A uses a true 600-dpi print engine — and it will soon be joined by a host of new, true-600-dpi PostScript laser printers.

Hewlett-Packard has announced the $2,999 LaserJet 4M, which uses the new 600-dpi, low-cost letter-sized Canon AX engine. When we tested a prerelease LaserJet 4M, it recorded faster times in all our tests and produced better-looking output than any printer in this report. Look for other companies to use the Canon AX engine as well. Also expect a host of companies to use the new 600-dpi tabloid-sized Canon BX engine in printers priced at less than $4,500. These new engines will reinforce 600 dpi as the standard for desktop PostScript printers.

### The Bottom Line

High-resolution PostScript printing is no longer a luxury. Soon it will be a standard feature in most offices, with only a marginal price increase and little penalty in performance compared with today's 300-dpi printers. The NewGen TurboPS/660, with its excellent text quality and a street price $1,200 less than the Xante Accel-a-Writer 8000's, gets our overall recommendation. The Xante Accel-a-Writer 8000 is the fastest of the three printers and a good low-cost choice for printing scanned photos and other continuous-tone images.

— Paul Yi

**Figure 2: Crisp and Clean**



Lexmark IBM LaserPrinter 10A | NewGen TurboPS/660 | Xante Accel-a-Writer 8000

**Figure 2a: When it comes to image quality, the Xante Accel-a-Writer 8000, with its detailed halftones and many shades of gray, is the clear winner.**




Lexmark IBM LaserPrinter 10A | NewGen TurboPS/660 | Xante Accel-a-Writer 8000

**Figure 2b: When output is enlarged to four times its actual size, the text quality of the Lexmark IBM LaserPrinter 10A, the NewGen TurboPS/660, and the Xante Accel-a-Writer 8000 is comparable. At smaller type sizes, the Xante type wasn't as crisp as that of the other two printers.**

**Figure 3: Fast and Affordable**

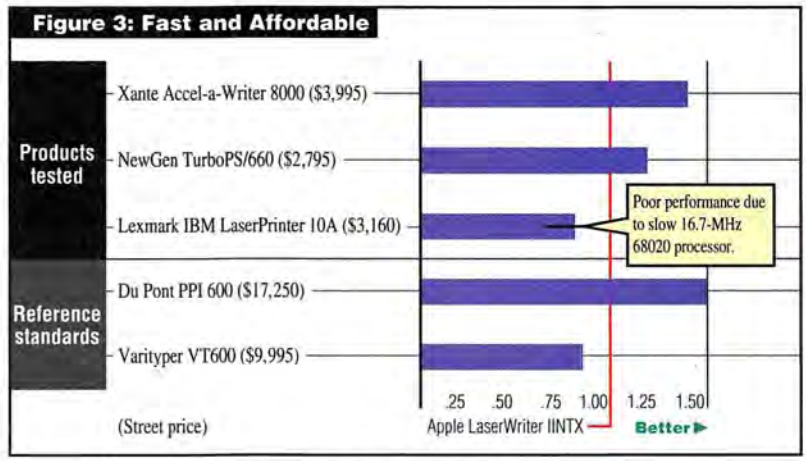
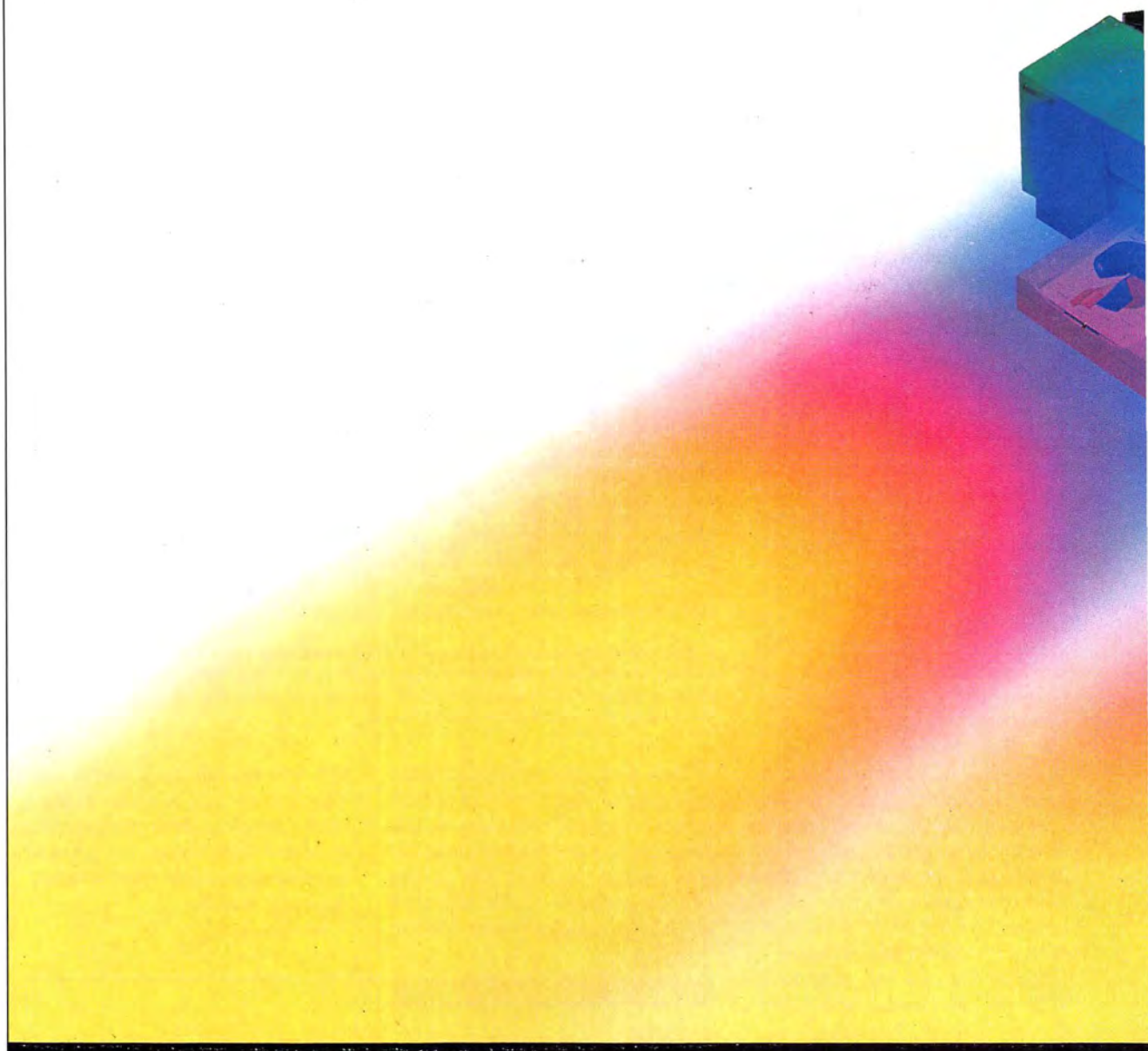
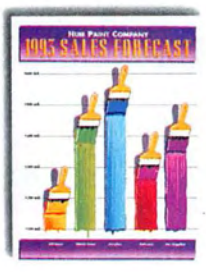



**Figure 3: Our suite of tests included printing a 30-page Word document, a complex PostScript graphic document, and a 4.5-megabyte gray-scale image. Results of all the tests were combined to obtain an overall score, shown relative to that of the Apple LaserWriter IINTX. In our February '92 report, the Varityper VT600 was the overall winner. The Du Pont PPI 600 is our most recent high-resolution champ, but it commands a stiff price ($17,250) for its excellent output.**



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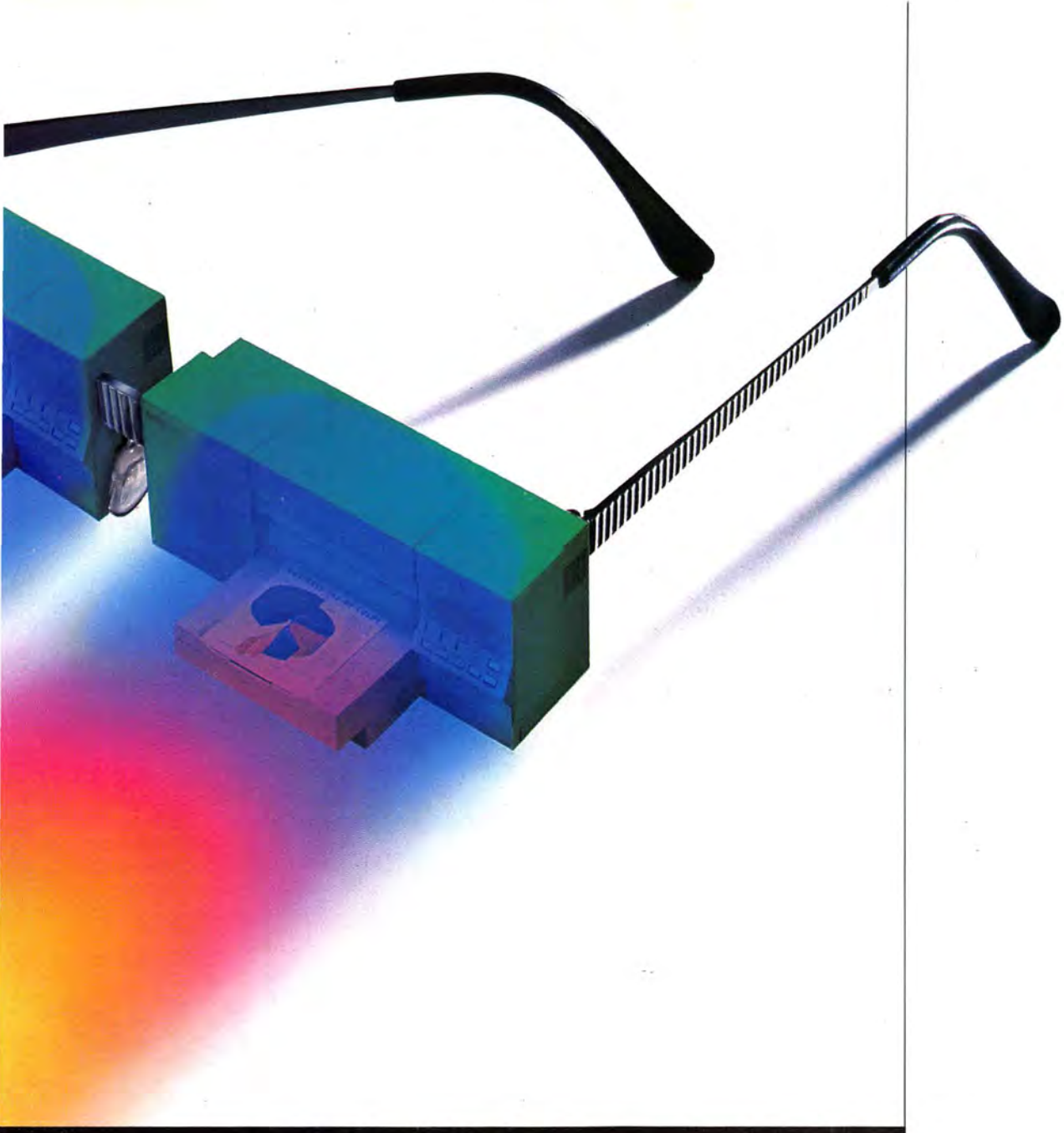
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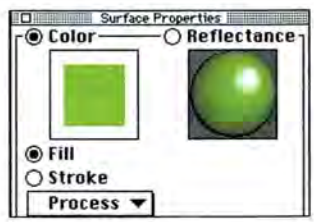
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**By Pamela Pfiffner**




**Fractaled fairy tales:** About a year ago, Kai Krause began posting Photoshop tips and tricks on America Online for public consumption. Now the German-born software whiz is packaging his know-how by publishing several dozen advanced techniques and **freaky Photoshop filters,** available on a $99 six-floppy set or a single CD-ROM disc. You'll find more gradient fills, fractal patterns, translucency options, and fish-eye effects than you could ever imagine, all packaged with a unique interface. (Adobe is *very* interested in what Kai's up to, by the way.) Sold through HSC Software. Call 310-392-8441, or log on to the Kai's Power Tips library of the Photoshop Forum on America Online. Fractals also form the foundation of Point of View's Elegance clip art, 300 easily **interchangeable pieces** you can embellish and combine for borders and frames. 800-397-7055 or 719-591-5320. $99.

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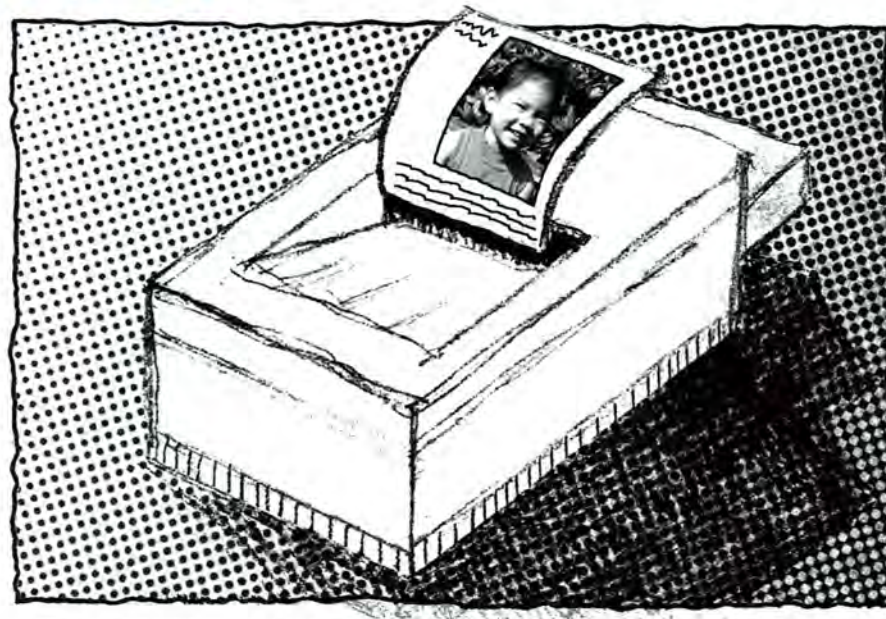
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# A Gray Area

*Thanks to improved printer technologies, you can now get good-quality halftones from black-and-white laser printers. Follow these tips to get great grays from your printer.*

**By Cary Lu**



Getting high-quality halftone images is the last frontier in black-and-white desktop publishing. Many accomplished desktop publishers who manage typography and line art with ease throw up their hands when faced with halftoning. What can go wrong with halftones? Just about everything. On a standard 300-dpi PostScript laser printer, desktop halftones are often coarse, dark, fuzzy, and muddy. When printed by an imagesetter, desktop halftones are often dark, fuzzy, and muddy.

Many desktop publishers have given up. They fall back on the old-fashioned method: letting the print shop create the halftone photographically and strip it in to the printing-plate negative. Or during scanning, they opt for creating a simple kind of halftone called a diffusion, or dithered, image, giving up sharpness and tonal range in exchange for easier production.

In truth, producing good halftone images on a desktop system takes some experience and skill, but the process isn't really difficult. You need to know a few basic principles and apply them to your own production system. In this article, we concentrate on producing great grays from your laser printer, but the same rules apply to imagesetter output at your local service bureau.

Why focus on laser printers? Two reasons: Despite all the attention paid to color — and even though the prices of color hardware are declining — many people, for reasons of economy or aesthetic preference, work in black-and-white. Cheaper and simpler to produce and reproduce than color, black-and-white art lends itself to photocopying or inexpensive offset printing when top-notch quality is not a priority. The recent flurry of printers optimized for halftones, such as the Apple LaserWriter IIg, the Xante Accel-a-Writer, and the NewGen TurboPS 880, makes it easier than ever to print good graphics from the desktop.

The availability of these new printers and their related products doesn't guarantee that you'll get perfect halftones at the push of a button. You need some understanding of what halftones are, how laser printers produce them, and how the production chain works.

First, some basics.

## Half a Tone

A halftone is essentially a printing trick, producing the appearance of grays when the printing ink or toner is only black. A halftone simulates grays with a grid, or screen, of variable-sized dots (black is a tone; the dots make up "half a tone"). The fineness of the screen — called the screen frequency or line frequency, measured in lpi (lines per inch) — is responsible for a picture's sharpness. (A fuzzy original or fuzzy scan always produces a fuzzy halftone, no matter what the line frequency, however.) Newspaper photographs are often printed with 85-lpi screens; magazines, such as this one, use screens of 133 lpi or more.

A halftone screen is usually not square with the image or with the paper edges; instead, it's set at a 45-degree angle to minimize the dot pattern, because the human eye tends to pick out vertical and horizontal lines more readily than other lines. (In four-color printing, each halftone plate is set at a different angle, calculated to reduce interference effects among the plates; for more on color halftoning, see "That's a Moiré," July '92, page 173, and "All the Right Angles," August '92, page 183.)

In a traditional photographically produced halftone, the sizes of the dots — and thus the number of apparent grays — can be varied continuously. But laser printers and imagesetters, both of which have fixed resolutions, cannot produce variable-sized dots. Instead, they have a regular grid of equal-sized dots, or pixels (corresponding to the device's resolution). Each of these dots can be printed or not, resulting in black spots or white spaces, respectively. To simulate variable-sized halftone dots, these devices group printer pixels into cells and then vary the number of pixels printed in each cell. The larger the cell, the more pixels it contains and the more levels of gray possible (see Figure 1). But the larger the cell becomes, the less detail the image has. Most low-resolution printers have to sacrifice levels of gray for sharpness, or vice versa — for example, a halftone generated on a standard 300-dpi PostScript laser printer, such as the LaserWriter IINT, looks coarse. The higher resolutions of imagesetters — upward of 1,200 dpi (or 4,000 dpi, in some cases) — means that they can pack more pixels into a cell and more cells into an inch. The result is halftones whose quality rivals that of traditionally produced ones (see Figure 2).

## Figure 1: Printer Spots and Halftone Dots

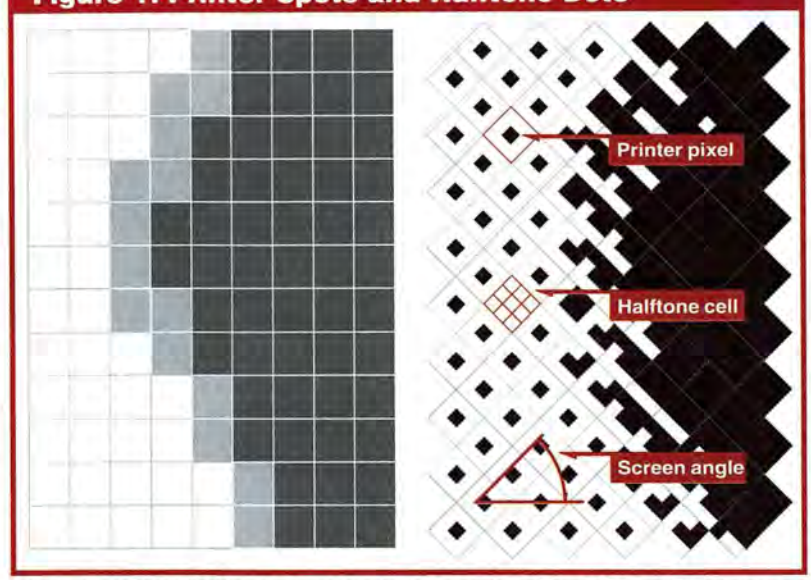



**Figure 1: Desktop halftones consist of two separate images. The scanned image (left) is sent to the PostScript interpreter in the printer. The interpreter creates the halftone image (right) by sampling the scanned image and grouping halftone dots into cells to simulate grays. In this simplified example, each halftone dot consists of nine possible printer pixels. Each printer pixel is turned on (black) or off (white) to create the illusion of gray. This example represents output from a standard 300-dpi PostScript printer without enhanced halftones.**

### Laser Limits

The simplest way to get better halftone output then is to use a higher-resolution printer. For example, standard 300-dpi PostScript printers such as Apple's LaserWriter IINT and others also based on Canon's LBP-SX engine have a default halftone screen of 53 lpi (33 gray levels). By comparison, Canon's new 600-dpi LBP-BX engine, used in the QMS 860 Hammerhead and the CalComp CCL-600, offers a default halftone screen of 71 lpi (73 grays). These printers will likely become the new standard for desktop laser printers. But if you're not prepared to purchase one of these, you can still get good halftones at 300 dpi.

Printer manufacturers these days are finding ways to improve the halftone capabilities of low-resolution printers. One method is to use subpixels, which are smaller than normal printer dots. Basically a trick of the printer's mechanism and software, subpixels give the printer's software more freedom in positioning halftone dots. A 300-dpi printer with subpixels can print a wider tonal range than can a 600-dpi printer with a fixed pixel size.

The Apple LaserWriter IIg, for example, comes with a halftone-enhancement technology called PhotoGrade, which uses subpixels. (The IIf also ships with PhotoGrade, but you have to add RAM to take

## Figure 2: Say You Want Resolution?



**Figure 2: Laser printers have to trade image detail for gray levels, whereas high-resolution imagesetters can produce halftones with smooth tonal gradations. The image on the left was printed on a LaserWriter IINT at its default line setting of 53 lpi; the image on the right was output at 133 lpi on an Agfa SelectSet 5000 imagesetter.**

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advantage of it.) PhotoGrade's default setting produces a 106-lpi halftone screen with 67 gray levels, about seven times the number of gray levels of a conventional 300-dpi printer and almost twice that of a conventional 600-dpi printer set at the same line screen (see Figure 3). Other printer manufacturers offer proprietary halftone-enhancement technologies, but Apple's LaserWriter and PhotoGrade are generally considered to be the standard. (For more on PhotoGrade, see "Image Makers," November '91, page 98.)

(The LaserWriter IIf and IIg also feature FinePrint, a smoothing technique that reduces the jaggies in text and line art and that functions independently of PhotoGrade. None of the halftone adjustments

**Figure 3: Making Grays with PhotoGrade**

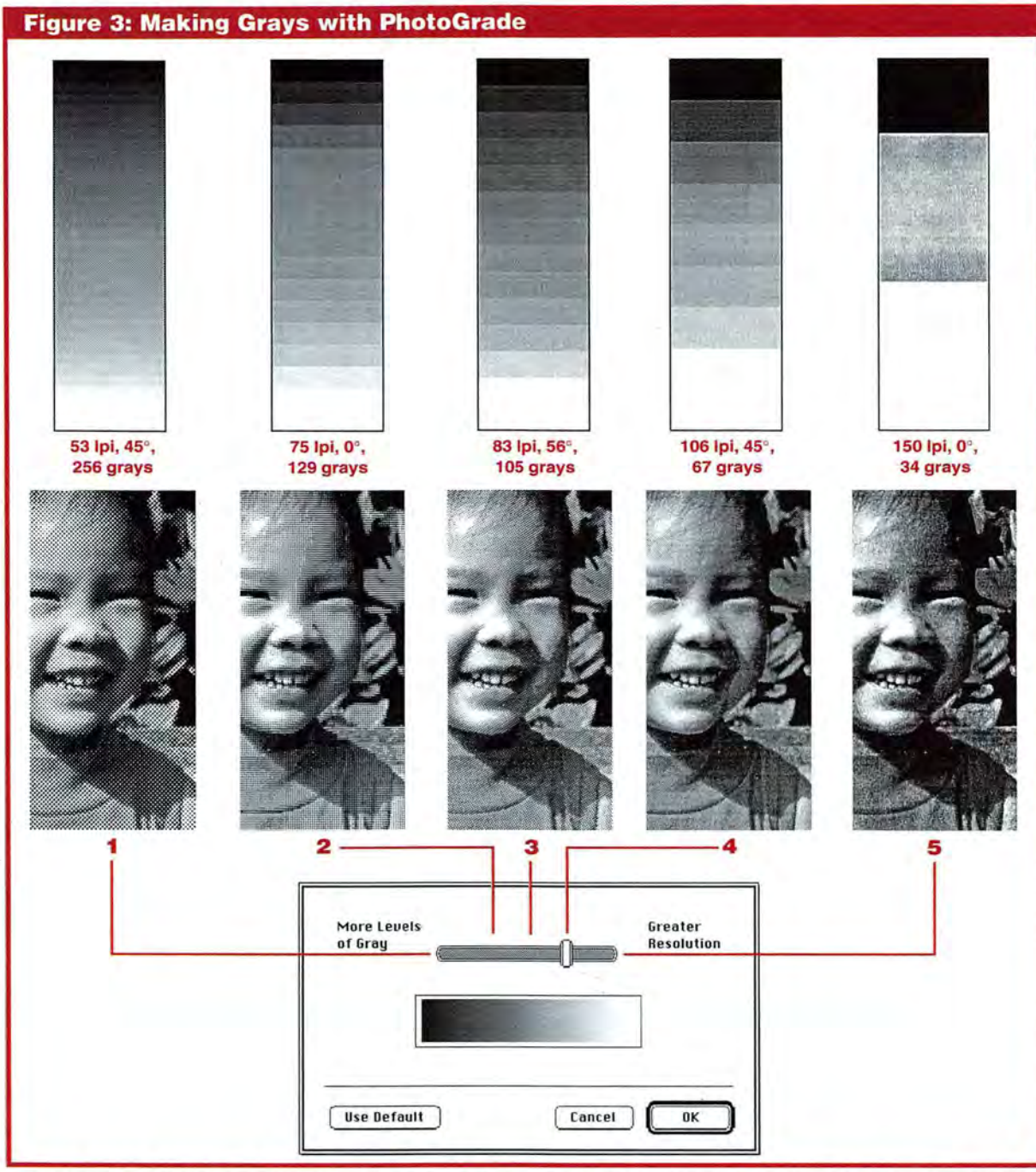



**Figure 3: Apple's PhotoGrade technology gives you a wide variety of halftone settings. These settings aren't clearly identified, so we've labeled them from 1 to 5. Setting 4 is the default for the printer. Setting 1 gives the best tonal gradation but slightly less detail, whereas setting 5 sacrifices gray scale for resolution. Experiment with similar settings on your printer. The original image was scanned on a Hewlett-Packard ScanJet Plus and calibrated separately by Ofoto for each setting.**

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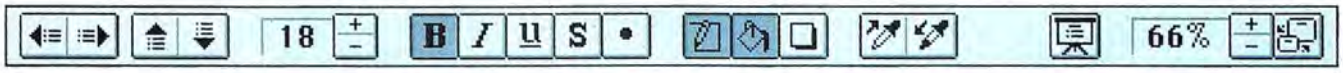
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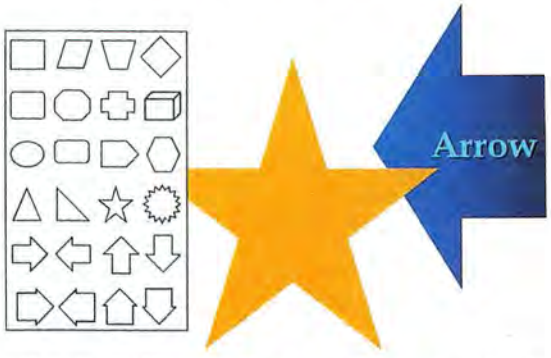

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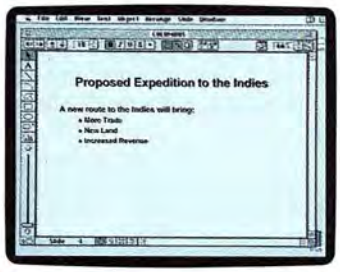
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described in this article affect any text or line art printed on the same page. Some laser printers, such as the Hewlett-Packard LaserJet III and IIIP, offer a text-and line-art-smoothing feature similar to FinePrint but no halftone enhancement.)

Some vendors use the subpixel approach to increase the resolution of the printer. Xante, for example, sells standalone laser printers as well as controller boards for popular Apple LaserWriter and Hewlett-Packard LaserJet models. The boards work with printing engines designed for 300 dpi, boosting them up to 600-dpi resolution and enhancing their halftones. Their default setting is 85 lpi (101 grays). Other vendors such as NewGen, LaserMaster, and Printware also soup up standard 300- or 400-dpi engines for higher resolutions and, in many cases, better halftones. (See Table 1 for standard halftone settings of several printers.)

In contrast, imagesetters produce fixed-sized image pixels like those of a conventional laser printer, but the pixels are so small that imagesetters produce an apparent range of halftone-dot sizes without having to resort to subpixel tricks. An imagesetter working at 2,540 dpi can produce a 133-lpi halftone with more than 200 grays, visually equivalent to a continuous halftone. Working at 3,386 dpi, an imagesetter can produce a 175-lpi halftone, close to the practical limit for normal printing presses.

### Be Prepared

Even if your printer is not optimized for halftones, you can get good-quality results — but you'll have to do some preparation. You have to pay attention to the entire production chain, from input to output. You don't need any exotic high-end graphic-arts tools to produce good halftones, but your basic tool kit should include

- A scanner capable of detecting 300 dpi and 256 levels of gray. Virtually all flatbed scanners sold today meet or exceed these requirements.
- Scanning software that controls the scanner and produces a gray-scale file. The software should offer calibration, a way to link the gray-scale sensitivity of your scanner with the halftone capabilities of a specific printer. Calibration is essentially a mapping between the halftone produced by the printer and the grays detected by the scanner (monitor calibration is a separate process). When you select a calibration, the scanning software adjusts or predistorts the gray values assigned to the pixels in the image in order to optimize the printed output.

Two scanning programs — LightSource's Ofoto, which is bundled with Apple's OneScanner and sold separately for $395, and DeskScan II, which is bundled with Hewlett-Packard scanners — feature calibration. Ofoto can control many popular scanner models (including the Hewlett-Packard scanners).

Some scanners come with a plug-in module for Adobe Photoshop that controls the scanner. Photoshop does not offer straightforward calibration, although it has an adjustable output-transfer function, which approximates calibration in the hands of skilled users.

- An application that can accept gray-scale information. All of today's major page-layout programs and many graphics programs can do grays; some programs have built-in halftoning controls that let you further refine images from within the application.
- A PostScript or compatible laser printer or imagesetter. Although you can get halftones out of QuickDraw or non-PostScript laser printers, inkjet printers, and even ImageWriters, the results are rarely satisfactory.
- A printing resource (printer driver) that supports the halftoning capabilities of your output device.
- Printer-description files. These ship with your layout and graphics software.

This completes the basic halftone tool kit, but there is one optional item:

- An image-retouching program, such as Adobe Photoshop, Fractal Design's ColorStudio, or Aldus' Digital Darkroom, which supplies the image control necessary for optimizing halftones.

Assuming that you've got the tools assembled, let's step through production.

**Table 1: Common Printer Line Frequencies and Screen Angles**

| Printer | Printer resolution | Halftone enhancements | Halftone setting | Line frequency | Halftone angle | Number of gray levels |
|---|---|---|---|---|---|---|
| Apple LaserWriter IINT/NTX | 300 dpi | no | default | 53 lpi | 45° | 33 |
| QMS 860 Hammerhead | 600 dpi | no | default | 71 lpi | 45° | 73 |
| Apple LaserWriter IIf/IIg with PhotoGrade | 300 dpi | yes | setting 1* | 53 lpi | 45° | 256 |
| | | | setting 2* | 75 lpi | 0° | 129 |
| | | | setting 3* | 83 lpi | 56° | 105 |
| | | | setting 4* (default) | 106 lpi | 45° | 67 |
| | | | setting 5* | 150 lpi | 0° | 34 |
| Xante Accel-a-Writer board and 4000/8000 printers | 600 dpi | yes | manual | 65 lpi | 45° | 170 |
| | | | default | 85 lpi | 45° | 101 |
| | | | manual | 95 lpi | 45° | 82 |
| NewGen TurboPS 880 | 800 dpi | yes | default | 75 lpi | 45° | 114 |
| | | | manual | 120 lpi | 45° | 45 |
| Imagesetter | 2,540 dpi | NA | NA | 133 lpi | 45° | 200+ |
| | 3,386 dpi | NA | NA | 175 lpi | 45° | 200+ |

*PhotoGrade does not label these settings; the author created them for this article.

**Table 1: The halftone capabilities of several common laser printers vary widely. Resolution, line frequency, and screen angle all affect the levels of gray achieved. Note that as the line frequency goes up, the number of gray levels goes down. Although the printer's default setting is often adequate, changing the line frequency can yield better results.**



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### Calibrating the Scanner

When you're producing halftones, it's essential to start with good raw materials. First, you need to calibrate your scanner, software, and printer:

**1.** Create a calibration chart on your printer. With Ofoto, go to the Calibration menu. With DeskScan II, open the Custom menu, select Print Path, and then click on New in the Printer dialog box. The calibration chart contains 256 levels of gray that your printer can produce. You can save the chart as a TIFF or EPS file. For halftoning purposes, these file formats are functionally identical. Files in PICT/PICT2 format are less suitable for halftoning, because the major page-layout programs do not fully support these formats.

**2.** Print the chart directly from Ofoto or DeskScan II if you want to use a printer's default halftone settings. Print the chart from within your page-layout or graphics program if you want to use the program's control over the halftone settings.

**3.** Scan the calibration chart. The name you assign to the calibration should specify all the important variables. Now your scanner and printer are in sync.

The first calibration is done. For the best results, you should create additional calibrations that are set for

- Each output device, if you have multiple printers.
- Different halftone settings, if you want to experiment.
- The paper type, if you plan to print on coated or tinted paper (gray, ivory, and so on).

Whenever the printing conditions change — whenever your toner cartridge becomes depleted, for example — you should repeat the calibration process.

### Scanning the Image

Once you've calibrated the printer, scanner, and software, you're ready to scan halftones. Remember to select the calibration setting you've saved for your scanning software and output device, which you access in Ofoto's Scan Controls window and through Path in DeskScan II's main window.

Scanner-control programs give you several options during the original scan. Leave the scanning depth — the number of grays per pixel — specified at 256 grays (8 bits); setting the depth to 128 grays (7 bits) is likely to create some banding in the final image even if the

## Adjusting Halftone Settings

Even after you've scanned or created a halftone image, printing it may seem to be a hit-or-miss proposition, because the control of the halftone can be adjusted in so many possible places.

First, you need to select Color/Grayscale in the Print dialog box. If you have a LaserWriter with PhotoGrade, you need LaserWriter driver 6.0.1 or later. LaserWriter Utility, a program that comes with the IIf and the IIg, can change the PhotoGrade settings in nonvolatile memory, so a change remains even after the printer is turned off.

Many programs set a default halftone line frequency of 60 lpi, which becomes 53 lpi (or 33 levels of gray) when sent to a standard, nonenhanced 300-dpi printer. If you want to get a finer line screen from your nonenhanced printer, you can set the frequency to 61 lpi — however, the number of gray levels will drop to about 20, too few for most photographs. You'll get the best results if you leave your printer set at its default line screen.

If your printer has a high resolution or enhanced halftones, you should change the default setting to a higher line frequency, such as one of those listed in Table 1. You can do this in several ways.

Some graphics and layout programs have their own default settings, which are tailored to your printer. Sometimes the default setting doesn't take full advantage of a printer's capabilities, however. For example, Aldus PageMaker's default halftone line frequency for a LaserWriter IIf is 60 lpi; this setting works fine if the IIf lacks sufficient RAM to turn on PhotoGrade. But if you've upgraded your IIf to turn on PhotoGrade, you should change the software default to 106 lpi or select the IIg printer setting, which will also give you 106 lpi.

Another way is to change the printer's setting. Programs from Aldus and Adobe use Adobe's PPD (PostScript Page Description) file for printer settings. QuarkXPress, on the other hand, uses a proprietary PDF (Printer Description File), which cannot be edited. To make a permanent change to the PPD (thus changing the default setting for all programs that use the PPD), use a text editor to find the following part of the PPD file:

```
*% === Halftone Information ===
*ScreenFreq: "60.0"
*ScreenAngle: "45.0"
```

Change `ScreenFreq` from 60.0 to 106.0 and leave `ScreenAngle` at 45.0 to set the PhotoGrade default values, or use the values in Table 1. Be sure to follow whole numbers with a decimal point and 0 — for example, you should enter 106 as 106.0.

You can override the printer's default settings within some popular programs. The most-flexible applications give you independent control over each image, not just for line frequency and angle but also for brightness, contrast, dot shape, gamma curve, and other options. If the entry reads DFLT or is blank, the program will use the printer's default settings.

Here's where to find image controls in several programs:

**FreeHand 3.1.** In Halftone Settings, on the Attributes menu.

**Illustrator 3.2.1.** In the PPD file or in Adobe Separator, which is intended for color separations. The Adobe Illustrator EPSF Riders file, if included in the folder with Illustrator, also contains halftone settings that can override printer defaults and Adobe Separator settings. The EPSF Riders file contains instructions; open it with a text editor.

You can also specify halftone settings in a PostScript file. Search for the line `%%EndSetup`. Insert these lines immediately afterward:

```
%%BeginDocument
currentscreen /p exch del
pop pop 70 45 /0 load
setscreen
%%end document
```

This sets a 70-lpi line frequency and a 45-degree screen angle.

**PageMaker 4.2.** In Image Control, on the Elements menu. Select Screened instead of Gray. You can make changes by entering the appropriate values, or you can override the PPD settings for PageMaker, modifying the PDX file to supplement and override settings in the PPD file. To change the PDX file, use the PDX editor, which is a HyperCard stack that comes with PageMaker, or use a text editor. Look for the section

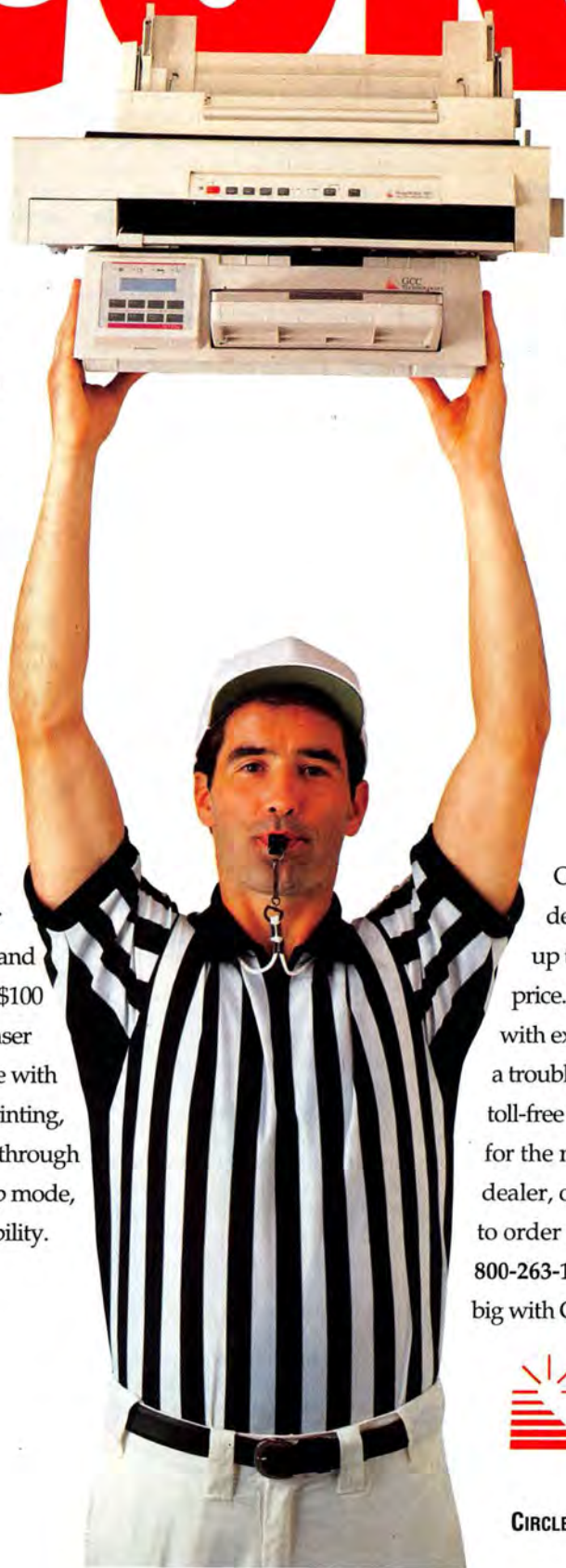
```
*ScreenFreq: "106"
*ScreenAngle: ""
```

Enter the necessary changes. The `""` indicates the printer's default setting for that parameter.

**QuarkXPress 3.1.** On the Style menu when you select a gray-scale image.

**Ready, Set, Go! 5.** In Image Control, on the Edit menu.

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printer produces fewer than 128 grays.

The scanning-resolution setting is not as clear-cut. The usual advice is to scan somewhere from 1.5x to 2x the halftone line frequency. If you're halftoning at 53 lpi, scan at 80 to 106 dpi; if halftoning at 133 lpi on an imagesetter, scan at 200 to 266 dpi. The idea is to give the PostScript interpreter enough scanned pixels to work from while it creates the halftone dots; remember that halftone dots do not have a one-to-one correspondence with the scanned pixels. Graphic-arts consultant and scanning expert Herb Paynter says that 1.55x is the optimum factor.

Higher scanned resolution is not necessarily better. The size of the image file varies as the square of the resolution — for example, a 2x file is 78 percent larger than a 1.5x file. A larger file means that you need more disk space and have to wait longer for the file to load. The higher the scanned-image resolution, the longer the PostScript interpreter takes to create a halftone. What's worse, unnecessary scanned-image resolution actually makes the halftone less sharp, because the interpreter must frequently sample and average across several scanned-image pixels. A moderate scanned-image resolution is better.

Once you've calculated the desired scanning resolution, adjust the number to match what your scanner can optimally produce. Scanners produce the best results at simple fractions of their resolution. Thus with a typical 300-dpi scanner, you should round up the resolution to 75, 100, 150, 200, or 300 dpi — for example, if you've calculated a resolution of 82 dpi for a 53-lpi screen (using the 1.55x factor), round that number up to 100 dpi.

### Halftone Settings

When you create halftones on a desktop system, you actually create two separate images. The scanned image is a gray-scale bit map with the pixels arranged square to its edges. When you print, the scanned image is sent to the printer, where the PostScript interpreter creates the second image, the actual halftone. The PostScript interpreter samples the scanned image, regardless of the image's resolution, averaging the tonal values of the pixels as necessary to render the halftone image at the desired line frequency and screen angle.

The PostScript halftoning process is programmable. Although default halftone settings work well for most images, you may want to change the settings. You can increase the line frequency to maximize sharpness when the gray-scale range is less important or to emphasize the contrast in a scientific image. You can also change the screen angle if it interferes with strongly defined lines in the image. (See the "Adjusting Halftone Settings" sidebar for more information on how and why.)

A word of advice: You can't use just any setting. PostScript changes values to something it can compute in a reasonable time. If you specify an arbitrary screen angle, for example, PostScript Level 1 printers will select the nearest of 13 possible angles, chosen because they require only simple arithmetic. PostScript Level 2 printers and Level 1 imagesetters that have Adobe's Accurate Screen technology permit thousands of angles, mainly to support color separations, but the processor still chooses only the values that are easiest to calculate. The five standard halftone settings of the LaserWriter IIf and IIg were selected because computing them is fast.

You cannot set the number of halftone gray levels — this number is a result of the screen resolution and angle setting. As already mentioned, you trade line frequency for gray levels: The higher the line frequency, the smaller the size of the halftone cells. You can have a laser printer produce a 300-lpi halftone, but at that line frequency, your image will be just black or white, without any grays.

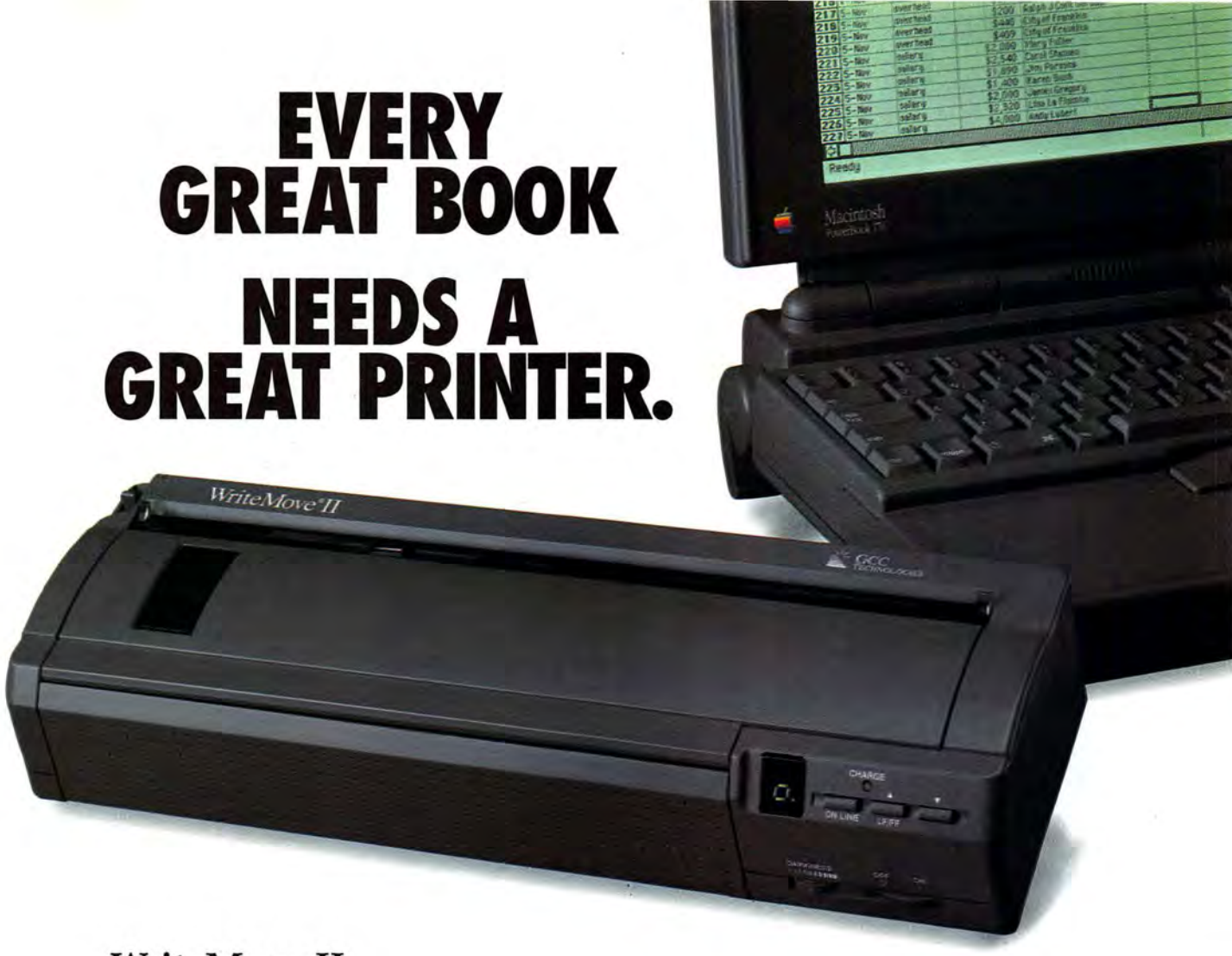
### Image Manipulation

Any halftone, however it's produced, has a limited density range, about 1.6 to 1 from the brightest to the darkest areas, compared with 100 to 1 in real life and roughly 4 to 1 in photographic transparencies. Every part of an image must fit within the limited halftone-density range. Many images need to have their highlights, shadow detail, and midtones adjusted for the best possible results. If you don't use Photoshop or a similar image-editing program, try the highlight-, shadow-, and gamma-adjustment features built in to your scanning software or page-layout program.

### Imagesetting

If your halftone will be produced by an imagesetter, the results will look markedly better than halftones from the best laser printers. A good imagesetting service bureau should supply Ofoto and

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DeskScan II calibration charts on request; if it doesn't have any, you can help it produce some. Sample output from an imagesetter — film or repro paper — isn't suitable by itself. To complete the output process, the calibration charts should be run off on a printing press onto the half dozen most popular paper stocks. The calibration charts have to be imageset only once and are so cheap to print that they should be free unless you have an unusual halftoning or paper requirement. If your service bureau does not have an in-house press, its printing company should provide calibration charts.

### Device-Dependence

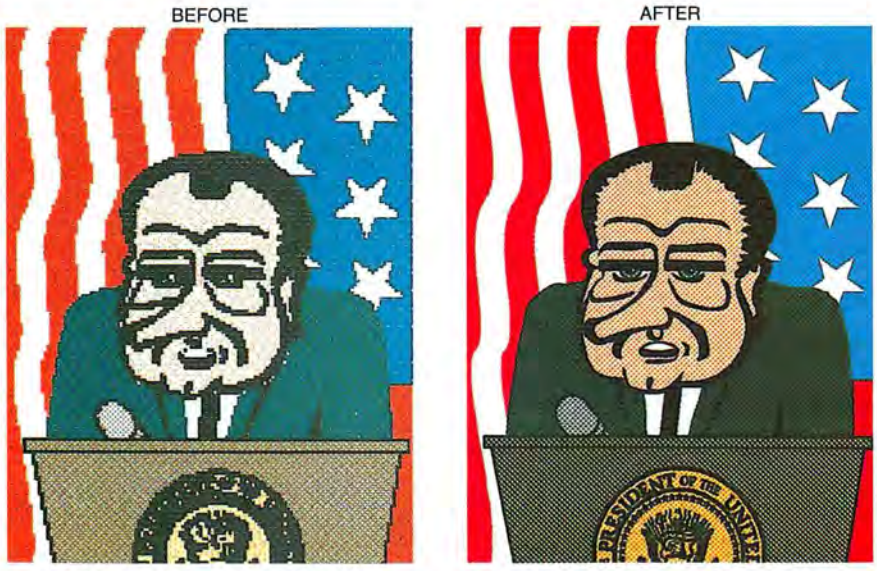
The halftone-calibration process violates one of the great principles of the Mac and PostScript. Once adjusted by calibration, a gray-scale scan is no longer device-independent. The file that is best for a laser printer won't be the best for an imagesetter. There isn't much you can do about this today. If the ultimate product will be imageset, then you should calibrate for the imagesetter and not worry about how the laser-printer proofs might look.

PostScript does have a transfer function that, in conjunction with a calibration standard, could perform device-independent calibration for both a printer and a computer display, but the feature has not been used so far. Color-calibration systems that have been developed by several companies, including SuperMac, Radius, and RasterOps, could be used to calibrate gray scale as well.

Laser-printer halftones should improve further. Some new printing technologies combine higher-resolution engines with microfine toner, resulting in high-quality output with tightly controlled toner placement and smooth, deep blacks and small subpixels. Today, high halftone resolution limits the number of gray levels available and produces banding in the printed image, but improved PostScript processing in the future may dither halftone dots across bands to smooth transitions. We've already come a long way in desktop halftoning. Like desktop typography, these gray-scale capabilities will soon be regarded as standard Mac tools.

**Cary Lu is author of *The Apple Macintosh Book*, fourth edition. He has typeset books for Academic Press and desktop-publishes a newsletter for bookstores in Washington and Oregon. Herb Paynter supplied technical assistance for this article.**

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# Pencil Test

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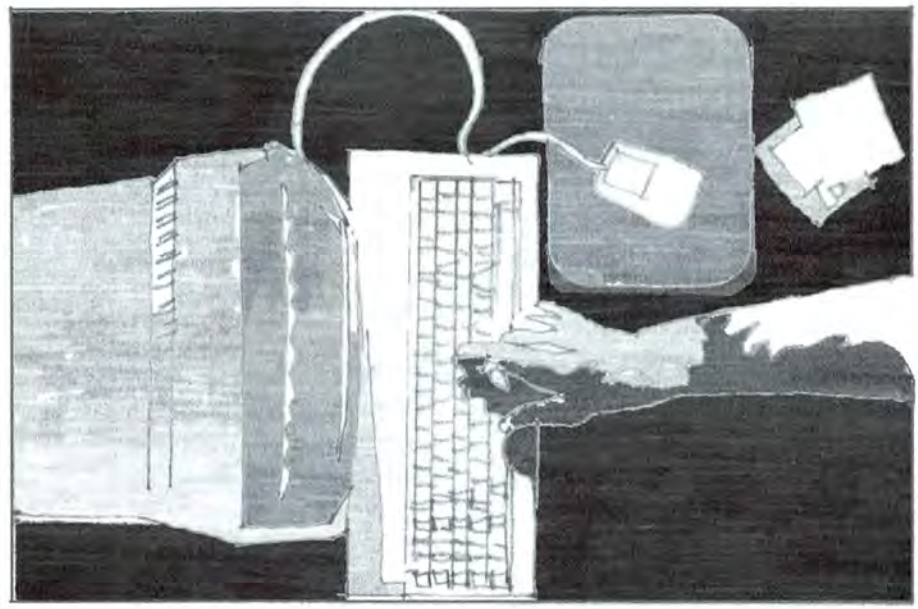
**By Janet Ashford**

If you like pencil-shaded drawings but think creating them manually takes too long, try using a scanned texture. John Odam made these pencil-style illustrations for a college textbook published by Wadsworth. The publisher wanted graphics similar to those Odam had created by hand for a previous edition. This time Odam decided to automate the process by using his computer.

First he created a palette of textures by making pencil sketches on paper, scanning the results, and using the brightness controls in Photoshop to create light, medium, and dark versions. Odam then drew a series of line figures in pencil and scanned them. He used Photoshop's magic-wand tool to select areas to be filled and then used its Paste Into command to import shadings into the areas or its rubber-stamp tool to pick up the textures and apply them. (Aldus' Digital Darkroom, Fractal Design's ColorStudio, Electronic Arts' Studio 8, and SuperMac's PixelPaint Professional provide similar tools.)

You can also achieve pencil textures by using graphics tablets with such programs as Fractal Design's Sketcher and Painter.

**Janet Ashford is a free-lance writer and designer based in Solana Beach, California.**



With Photoshop and a scanned pencil texture, John Odam creates the look of a pencil drawing for a series of college-textbook illustrations.

### 1 Sketching a Texture



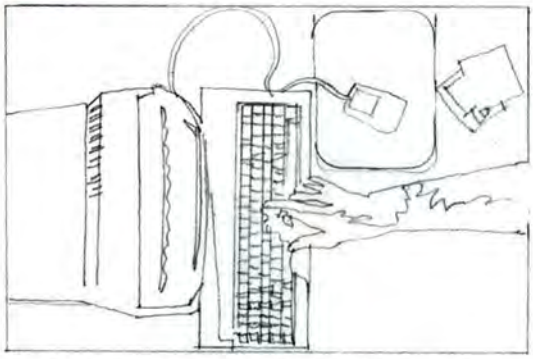
With a soft pencil, Odam rubs a medium-gray tone onto a piece of vellum. He scans the paper at 150 dpi, opens it in Photoshop, and saves it as a TIFF file called Pencil Texture M. The swatch is about 4.5 x 3 inches, matching the overall size of the drawing.

### 2 Making a Texture Palette



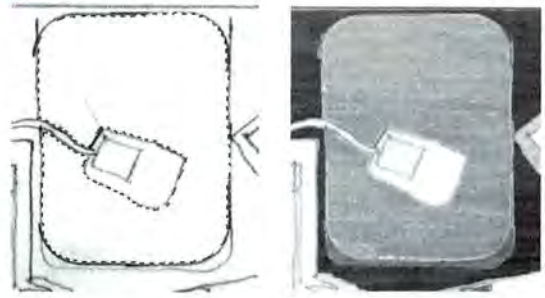
Using the brightness/contrast controls (on the Adjust submenu, on the Image menu), he decreases or increases the brightness of the original scan. He saves each edited texture — using the Save As command — to produce a final palette of five tones: very light, light, dark, and very dark (shown here), and the original medium (shown in Figure 1).

## 3 Scanning a Line Drawing



For an illustration about computers, Odam draws a computer monitor, keyboard, and mouse in pencil on vellum, using a photograph for reference. To retain the soft look of pencil, he scans the drawing as a 150-dpi gray-scale TIFF file (rather than as line art) and then uses the brightness/contrast controls to increase the contrast so that gray areas drop out.

## 4 Applying the Paste Into Command



a b

Now Odam begins copying the textures into areas of the drawing, such as the mouse pad. First he selects the area with the magic-wand tool (a) and opens the medium-pencil swatch. Using the marquee tool, he selects an area of the texture approximately the same size as the mouse pad. He copies the texture to the Clipboard and pastes it into the line drawing (b), using the Paste Into command from the Edit menu.

## 5 Using the Rubber-Stamp Tool



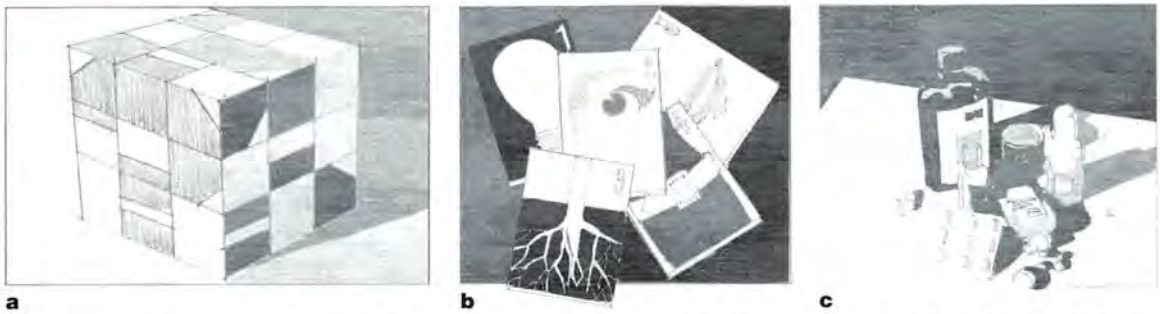
To fill the shadow area of the hand and forearm, Odam selects the area with the magic wand and opens the dark-pencil file. With the rubber-stamp tool, he samples the texture by Option-clicking at its center and then paints the texture into the line drawing. Keeping the selection area active prevents the texture from spreading beyond its boundaries, but applying texture in strokes adds shading without filling the selection area right up to the edges.

## 6 Softening Hard Lines



After adding textures to the rest of the drawing, Odam uses the smudge tool to soften some of the borders between the light and dark areas — between the light and dark areas on the hand and arm, for example.

## 7 Finishing the Drawings



a b c

Without cramping his hand-drawn style, Odam uses similar techniques for other illustrations in the book, such as these about problem-solving (a), vocabulary improvement (b), and drug abuse (c).



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# BRIDGES

What's the next step when Ethernet's too slow? — FDDI? CDDI? Maybe not. Grand Junction Networks (510-487-5985) recently proposed a new standard called, simply enough, Fast Ethernet. It promises 100-megabit-per-second bandwidth over the same unshielded twisted-pair wire used today for the 10-megabit-per-second 10BASE-T. Backward-compatible too. Projected cost per node: two to three times what 10BASE-T costs.

**By Henry Bortman**



**Token inspection:** Do your Macs on token ring always work the way they should? Didn't think so. That's why AG Group (510-937-7900) recently shipped a **new addition to its family** of software protocol analyzers. Priced at $995, TokenPeek decodes a wide range of protocols running over token ring.

**Call-in chaos prevention:** Apple ships AppleTalk Remote Access (ARA), and suddenly everyone wants to dial in to the network — at the same time! Fear not, Shiva and Cayman Systems have each announced multiport ARA dial-in servers. ➤➤ Unlike the first ARA server from Shiva (617-252-6300), the LanRover/L, which offered only a single serial port and LocalTalk connectivity, the LanRover/4E ($1,999) and the LanRover/8E ($2,999) offer four and eight serial ports, respectively, and connect to an Ethernet network. The LanRover/E models have the same security features as the LanRover/L: call-back and the ability to restrict the zones to which dial-in users have access. ➤➤



The GatorLink ($1,899), from Cayman Systems (617-494-1999), is a three-serial-port Ethernet ARA server. The GatorLink doesn't support callback, but you can get a software upgrade for $495 that lets you take advantage of a Security Dynamics SecurID ACE/Server on the network. With this system, users carry **credit-card-sized devices** that generate unique ID codes to authenticate remote users. The code changes every minute or so. If you don't know the magic number at the precise time you call, the SecurID server won't let you connect to the network.

**Devising local strategies:** Sonic Systems (408-736-1900) has three software-only products that make it easy to connect LocalTalk devices to Ethernet. Say your Mac's on Ethernet. Connect a LocalTalk device (such as a printer or a networkable modem) to its printer port, install PowerBridge ($149), and — voilà! — the LocalTalk device appears on the network as if it were on Ethernet. LaserBridge ($199) is similar but more specialized; you can daisy-chain as many as five LocalTalk printers (but not other devices) to your Mac's printer port. SuperBridge ($249) allows any five LocalTalk devices to do the **"pretend we're on Ethernet"** thing. ➤➤ Farallon Computing (510-596-9000) has two software products that inhabit the same ecological niche as Sonic Systems': LocalPath ($199) supports as many as eight LocalTalk devices of any kind connected to a Mac on Ethernet, and PowerPath ($149, bundled with two LocalTalk StarConnectors) supports one LocalTalk device.



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| Ether10-T AAUI | $149 | 10T+FPU | $399 |
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CIRCLE 178 ON READER SERVICE CARD.

# Pushing Beyond Paper

*The way we manage documents on computer networks is about to change radically. Here's a look at the office of the '90s and the vendors who are bringing it to us on the Mac.*

**By David Beaver**



ILLUSTRATION: JEFF KOEGEL

The office of the future is coming, and it's not paperless. Yes, there'll be less paper, but the term *paperless* misses the point, because it sounds as if we're giving something up. In fact, we're replacing the old office system with something that offers more — new types of documents and document management that truly take advantage of the capabilities of our computers and the networks that connect them.

Today's capabilities may not lead you to believe that we're on the threshold of a new way to work with documents. Sure, we can attach electronic documents to E-mail messages and send them to other people over a network, but we still run into problems such as incompatible document formats, version confusion, and the lack of a means for signing off on things. The truth is, most of us still print on and exchange a lot of paper — and spend a lot of time searching through filing cabinets for the documents we need.

Change is coming, however, and it's not that far off. With the help of a wide mix of software and hardware vendors, users on Macintosh (and PC) networks will soon be working together on sound- and image-enhanced, nonlinearly structured, *better-than-paper* documents — using tools that make it easy to assemble, store, find, exchange, track, and approve these electronic documents over a network without the necessity for enormously expensive mini- and mainframe-based systems.

## Serving Up Documents

A key component of the office of the future will be the *document server*, designed to make storing and retrieving documents much easier than it is with file cabinets — or file servers.

Beyond a certain level of use, conventional file-server technology just doesn't cut it. If you can't remember that the proposal you want is in the folder Acme Umbrella Company, which is in the Active Prospects–1992 folder on your file server, you'll spend a lot of time trying to find it. You may even give up and just start from scratch. Either way, computers haven't helped your productivity much.

With document-server technology, you store all documents on a central document server rather than on a file server and keep information about them in a document database. You can assign data such as keywords, client names, document types, and user names to documents and then quickly find all the documents whose assigned data values meet specified criteria. You can find documents that were created by anyone in your workgroup, view revision histories and previews of the documents without launching the entire application, and "check out" a document so other users can't change it while you work on it.

Products of this kind have been around at the high end of the market for the past few years, used by companies and departments whose documents are valuable enough to justify the cost (often more than $2,000 per user). Several simple, low-end solutions are

available for DOS networks, but they can't be easily rewritten for Mac environments, which have to handle many more types of letters, memos, drawings, and multimedia documents. The Mac market does include some handy file- and text-search utilities (for example, Microlytics' GOfer, ON Technology's On Location, and MVP Software's Retrieve It!), but they're practical only in single-user mode and document management is a multiuser issue.

Fortunately, a good selection of document-library systems for Mac networks should be available soon — at prices that will make them attractive to even small businesses. Odesta Systems' Open ODMS products (ODMS Workgroup System, ODMS Toolkit, and ODMS API) are now available for low-end UNIX servers as well as expensive VAXes. Documentum is developing a high-end UNIX-based product for the Mac and Windows. Interleaf, a leader in high-end publishing, is moving its UNIX-based RDM (Relational Document Manager) to the Mac. And Saros, whose Mezzanine product has been a leader in the midrange of the DOS world, plans to release a Mac front end for its OS/2-based server early in 1993.

Each of the expected products, and probably any others in development, use the same basic architecture. Documents and data are stored on a dedicated server, which is accessible to all the users on the network. A simple interface, often using a library metaphor, lets users search for documents and check them in and out. Features such as document histories, revision tracking, and group-based security are often included. In most cases, document data is stored in industry-standard SQL databases from companies such as Oracle or Sybase, using the client/server model (see "The Client/Server Revolution," November '91, page 185).

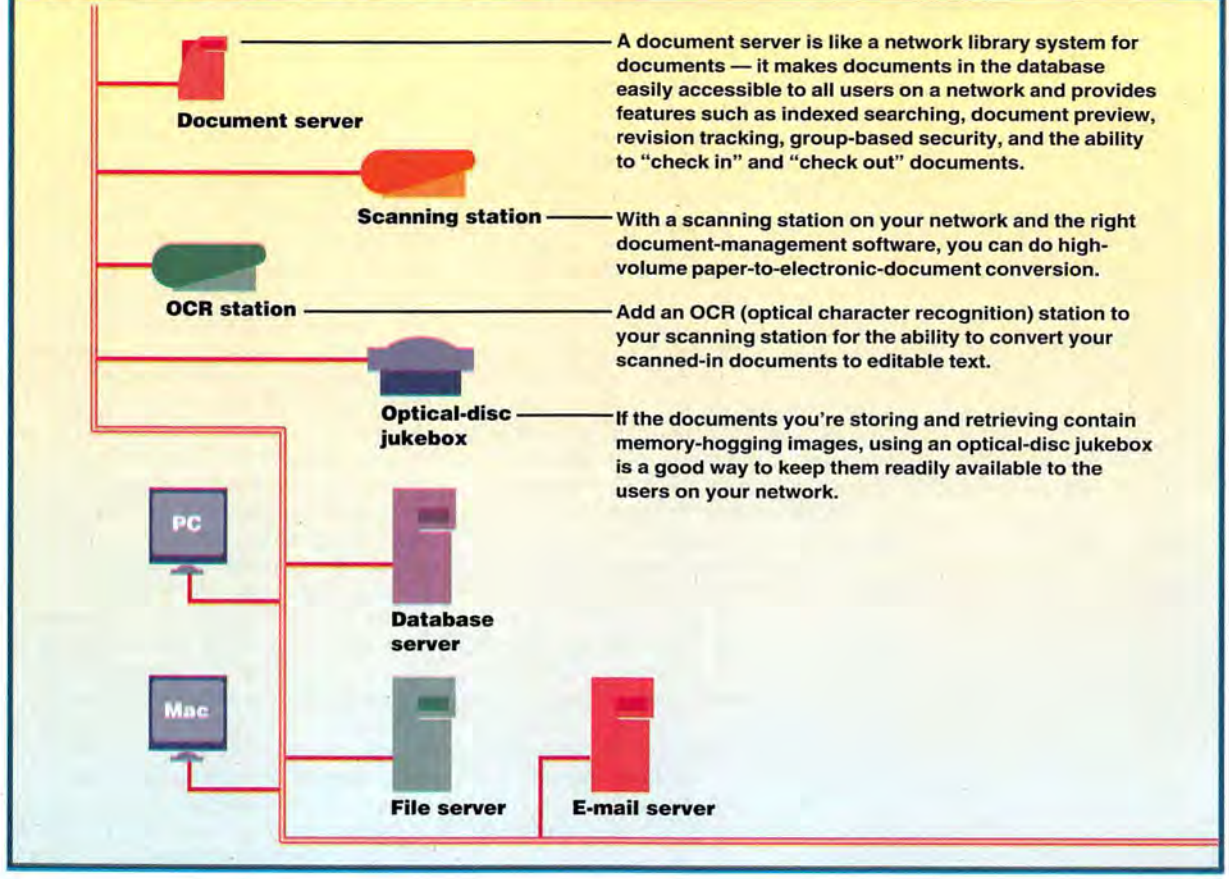
These products have seemed far-off dreams for Mac users, however. First of all, none of them uses Apple hardware as the document server, because historically, no Mac has had enough hardware and software power to support high-volume document storage. Second, the high cost of a minicomputer server such as a VAX or a Sun machine has put off many potential users. But prices of these servers are dropping dramatically — for example, you can now support 40 users with $15,000 worth of hardware; two years ago, the same support would have cost $40,000. And Apple's own UNIX-based server, expected to be well suited to document-management applications, should appear sometime in 1993.

The unknown factor with future Mac document-library products is how well they'll fit into the Mac's user interface. Although the Finder isn't perfect, it's familiar to many people; to be successful, document libraries will have to fit into the Finder as transparently as the file servers they replace. Vendors that do it right will enjoy a huge market for document-library products in the coming years.

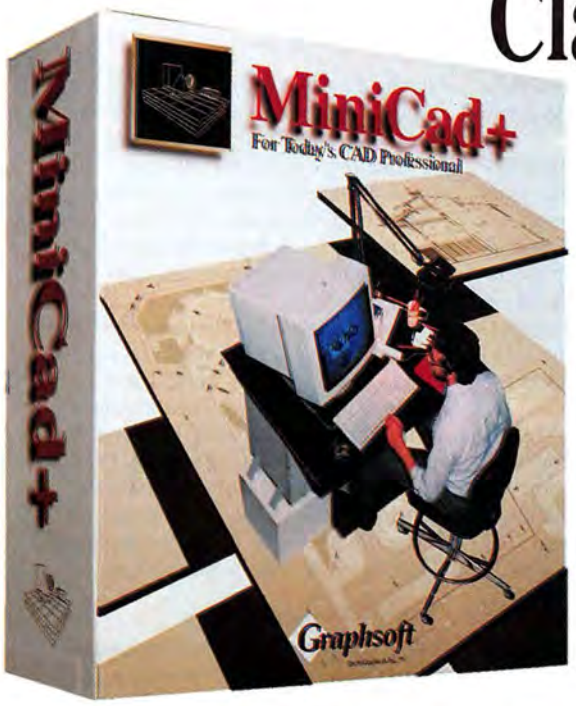
### Full-Text Search Ahead

Once you've set up a central document library, the obvious next step is to be able to find documents that contain any word

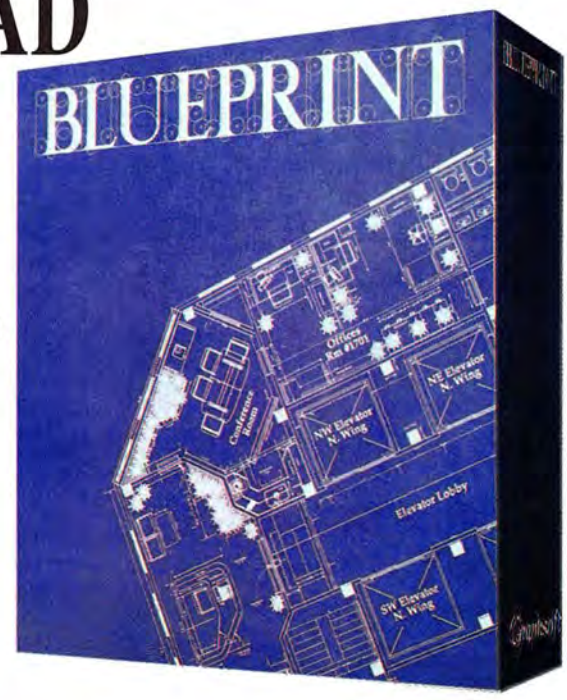
**Figure 1: The Office Network of the '90s**



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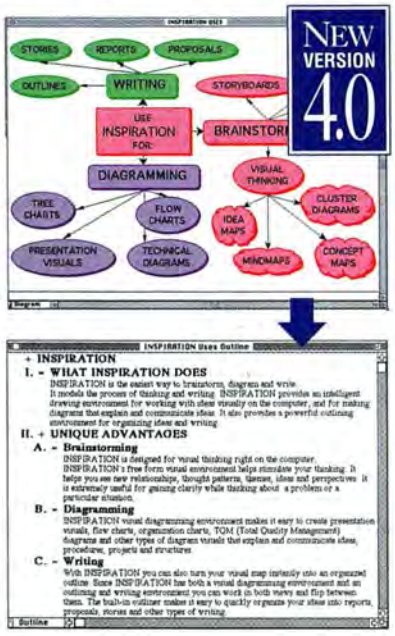

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# DOCUMENT MANAGEMENT

or combination of words — and find them at the speeds you expect of electronic access.

Again, products with this capability have been on the market for many years in the mainframe and minicomputer worlds; the news is, they're now finding their way to the Mac. By building special lists (called *indexes*) of all the words in every document, these systems can perform searches with mind-boggling speed — taking less than a second to find one word in 100,000 pages of text.

These products also allow complex searches, so you can look for combinations of words that occur under particular conditions (for example, "Find all documents that don't contain the word *IBM* but do contain the word *Apple* within 30 words of the word *Microsoft*"). The Mac (like PCs with Windows) raises some interesting technical problems, such as the need to filter searchable text out of documents containing formatted text and graphics, but vendors are writing software to handle such situations.

The key to full-text searching is that you must index your documents ahead of time — and, of course, they need to be electronic documents, stored in your computer. Scanners and OCR (optical character recognition) software enable you to convert existing paper documents into machine-readable form. Some of these products are optimized for high-volume operations — scanning all the paperwork for large legal cases, for example. This sort of document conversion can be expensive, but it's worthwhile when the benefits of quickly finding data outweigh the costs of getting that data into the computer.

A useful product for this process is the Micro Dynamics' MD-MARS system, with its FreeForm text-search software. Although it's a Mac document-management product, it's certainly high-end: It lets you connect scanning stations, OCR stations, and many users to central document servers. And Verity recently released a Mac front end to Topic, its popular UNIX-based full-text-search system.

### Photo-Finish Finding

Of course, document searching doesn't have to mean searching for text; it can also mean searching for images — a useful option for situations in which you don't need to edit the documents. With *document imaging,* a document is scanned and stored as a picture rather than as an editable document, saving you time-consuming and machine-intensive OCR processing. Once the image is stored in your computer, you can fill out additional data fields to categorize it. You can then

**Table 1: Mac Document-Management Functions —**

✈ = shipping now
✸ = announced

| Companies and products | Document library | Full-text searching | Image storage |
|---|---|---|---|
| **ACIUS** 4th Dimension with 4D modules | ✈ | | |
| **Documentum** DocuWorks | ✸ | ✸ | ✸ |
| **Frame** FrameReader | | | |
| **Interleaf** RDM | ✸ | | |
| **Interleaf** WorldView | | | |
| **Lotus** Lotus Notes | ✸ | ✸ | |
| **Micro Dynamics** MD-MARS with FreeForm | | ✈ | ✈ |
| **Odesta** Open ODMS products | ✈ | | ✈ |
| **Saros** Mezzanine | ✸ | ✸ | |
| **Enabling technologies** | | | |
| **Adobe** Carousel | | | |
| **Apple** Bento | | | |
| **Apple** OCE | | | |

use these data-field values to search for the image in your document database. (Although they share similar technology, document-imaging products are intended to be used for a different purpose than are *image-management* products, such as Aldus' Fetch, which are designed for searching catalogs of color photos and other graphic images.)

Storing documents as images isn't the answer for every organization, but where it is appropriate, it can make an immense difference to the way you work. Generally, imaging works best in cases in which data is gathered on paper and needs to be accessed, but not edited, by many users; good examples are medical histories and police crime reports. Without imaging, these pieces of paper could be in only one place at a time, but imaging and storage make their contents available throughout a network.

Because imaging systems store documents as images instead of as text, they require a central document server with huge amounts of storage space. To meet this requirement, large imaging applications can use *jukeboxes* of optical discs, making many gigabytes of images readily available. Micro Dynamics' MD-MARS system handles this type of application well, and many expected future products will address this market also.

### Teamwork Made Easy

Document servers and document-imaging technologies help you store work that has already been created, but they don't address the cases in which creating documents is the hard part. Conventional document applications such as word processors fall short in two kinds of complex situations: when multiple users need to work on the same document and when you need to build documents by pulling boilerplate sections together into a new document — for complex proposals and legal contracts, for example.

But database technology is coming to the rescue here. With *document-assembly* applications, you can store individual pieces of documents (paragraphs or sections) as database records and then choose which of them you want to pull into your final document. A multiuser database lets many users work on separate pieces simultaneously; only final assembly and printing is restricted to a single user.

Document-assembly issues are similar to those of *database publishing*, so leaders in the latter technology area are working hard to provide the necessary features (the ability to use different boilerplate text under different conditions, for example). A popular document-assembly strategy is to use ACIUS' programmable add-in modules for 4th Dimension — such

### What's Shipping, What's Announced

| Work-flow management | Document assembly | Mac and Windows support | Paperless distribution |
|---|---|---|---|
| | ✈ | | |
| ✸ | | ✸ | |
| | | ✈ | ✈ |
| ✸ | | ✸ | |
| | | ✸ | ✸ |
| ✸ | | ✸ | |
| ✈ | | | ✈ |
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| ✈ | | | |
| ✸ | | ✸ | |
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# DOCUMENT MANAGEMENT

as 4D Write, 4D Calc, and 4D Draw — to generate the images and then to export the completed data to a page-layout application such as Frame Technology's FrameMaker.

Of course, it's hard to talk about collaborative document creation without touching at least briefly on the larger issue of work-flow management — getting documents into the hands of the people who need to see them (and getting them back) at the right times. Many of the document-server products discussed here include document-routing features for work-flow management (see Table 1). And a Mac version of Lotus Notes, an innovative Windows workgroup-communication product with some document-management features, is expected to ship by early 1993. But the major news in the Mac market is OCE (Open Collaboration Environment), the new technology Apple is developing to encourage and enable document routing and to provide features such as digital signatures (see "On Beyond E-Mail," March '92, page 191). If Apple gives OCE the features document-routing applications need and succeeds in making it a cross-platform standard, we expect it to become a central part of any Mac document-management system.

### Paperless Is More

It's a shame that our computer-created documents are still distributed mostly on paper. Paper does have its benefits: It's a universal standard, and you don't need much hardware or software to read it. But technologies such as CD-ROM and hypertext offer features that paper can't provide — fast searches, sound and video attachments, and associative linking, for example — and they offer a much lower distribution cost than printed documents in many cases.

Several vendors offer products that make electronic-document distribution easier by providing *reader applications* that read documents of a specific format. Good examples are Frame Technology's FrameReader and Interleaf's WorldView, low-cost, run-time versions of those companies' high-end desktop-publishing applications that can be licensed for mass distribution. When you put your documents onto CD-ROM or floppy disk along with the reader application, users can read them on just about any platform. Users cannot make any changes to the documents, but they can navigate hypertext links between sections and use other features such as full-text search.

The hot news in this area is Adobe's announced Carousel project. Adobe will provide the tools for printing any document to a Carousel file, and the Carousel reader application will let you read the file with all fonts, graphics, and visual elements intact (even on Windows and DOS machines) and will also give you options such as adding hypertext links and looking at thumbnail page previews.

### Totally Sharable Documents

Of course, for electronic documents to be truly sharable, you need to be able to work with them, not just read them, on different platforms. To date, the many attempts to develop vendor-independent standard document formats have failed in the market.

Enter Apple, with a document-format technology code-named Bento. Bento is intended to be an open, standard document-storage format that can include all current multimedia data types and be extended for new data types. Apple is encouraging developers to use Bento as the document format in future versions of their products and is attempting to make it a cross-platform standard by providing the software modules at low cost to anyone who's interested.

Bento won't mean much to users unless a critical mass of off-the-shelf applications take advantage of it, though. Look for some of these applications by mid-1993.

### Back to the Future

Powerful document-management products have provided productivity improvements for high-end-workstation users for the past few years; as Mac technology becomes more powerful, several of these products are moving down to the Mac desktop.

We fully expect that personal-computer operating systems of the year 2000 will include many document-management features and hooks and that major file-server vendors will merge document-library features into their products. When these changes occur and we discover how effectively we can manage and communicate with electronic documents, our struggles to give up paper will seem endearingly backward. If only we'd known what a small sacrifice it would be.

**David Beaver is president of The Automation Group, a Mac-database-consulting firm in San Francisco.**

## Directory

**ACIUS, Inc.**
10351 Bubb Road
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408-252-4444
***4th Dimension 3.0,*** $895

**Documentum, Inc.**
5724 W. Las Positas Blvd., #150
Pleasanton, CA 94588
510-460-4120
***DocuWorks,*** no price available

**Frame Technology Corp.**
1010 Rincon Circle
San Jose, CA 95131
800-843-7263
408-433-3311
***FrameMaker,*** $795
***FrameReader,*** $89.95

**Interleaf, Inc.**
Prospect Place
9 Hillside Avenue
Waltham, MA 02154
800-456-5323
617-290-0710
***RDM and WorldView,*** Mac products not shipping at press time

**Lotus Development Corp.**
55 Cambridge Parkway
Cambridge, MA 02142
800-688-8320
617-577-8500
***Lotus Notes,*** $79,500 for 200-user minimum when purchased from Lotus; approximately $700 per user when purchased through VARs

**Micro Dynamics Ltd.**
8555 Sixteenth Street
Suite 701
Silver Spring, MD 20910
301-589-6300
***FreeForm,*** price varies widely
***MD-MARS,*** approximately $70,000 for basic system; price varies widely

**Odesta Systems Corp.**
4084 Commercial Avenue
Northbrook, IL 60062
800-323-5423
708-498-5615
***ODMS API*** *(optional),* $7,500
***ODMS Toolkit*** *(optional),* $25,000
***ODMS Workgroup System,*** $1,500 per client, $10,000 per server

**Saros Corp.**
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700 Plaza Center Building
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800-827-2767
206-646-1066
***Mezzanine,*** no Mac price available


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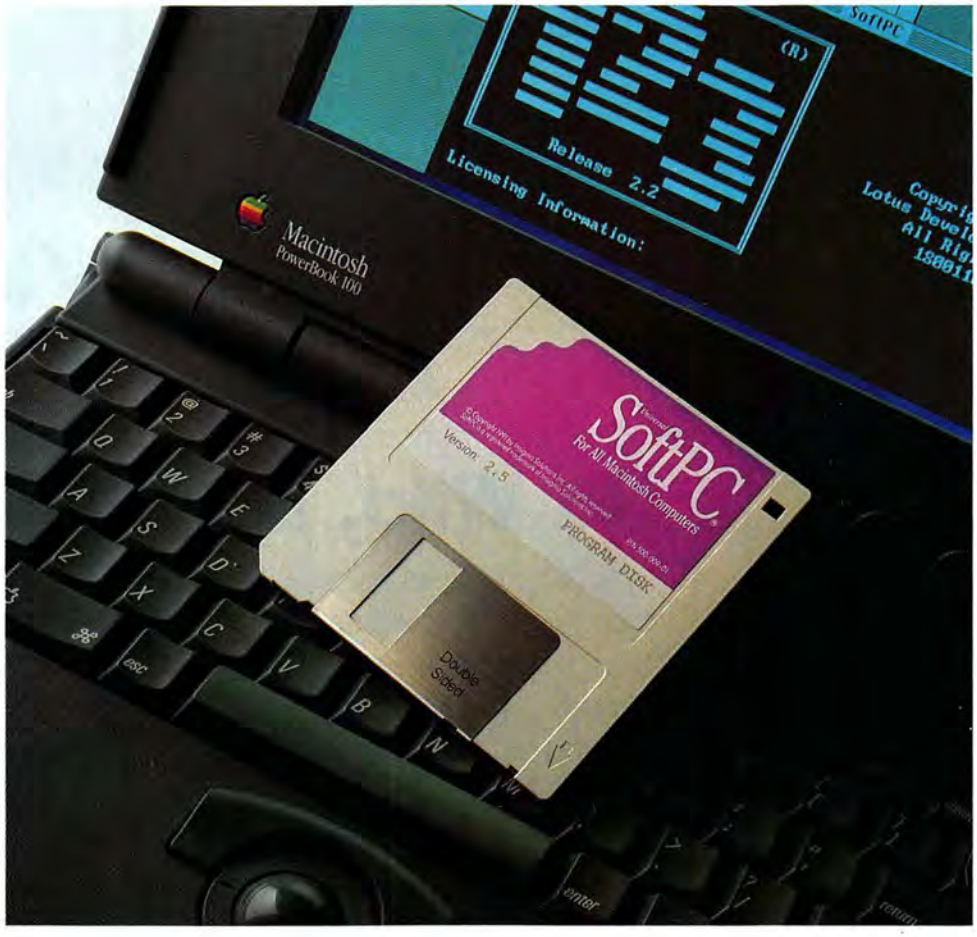
The fact is that the tortoise population has declined as much as 90% over the last fifty years. This drop is a true biological indicator of how severely the desert ecosystem is at risk.

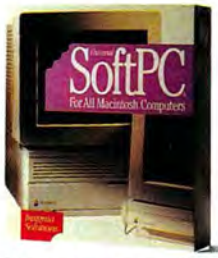
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# Breaking the Print Taboos

*Don't believe all you hear about cross-platform printing — it may require fewer blood sacrifices than you think.*

**By John Rizzo**



ILLUSTRATION: LIN WILSON

The Mac and PC tribes have created strange myths about each other, especially in the area of cross-platform printing. "PC printers don't use PostScript," a Mac user might assure you, and PC users might insist that they can't use Mac printers because "AppleTalk is too slow."

Myths, according to the late Joseph Campbell, usually serve the purpose of helping us relate to a seemingly unfathomable universe. With that in mind, let's take a look at the universe of multiplatform printing to see if we can make it easier to fathom — and debunk a few myths in the process.

A core myth is that using Novell NetWare, the god of networking in corporate circles, is the best way to meet all connectivity challenges, including multiplatform printing. This myth does teach us that Macs and PCs can share the same network services. The problem occurs when we take the myth literally — in this case seeing NetWare as the entire world of Mac/PC connectivity. Although it provides great solutions to lots of problems, NetWare can be overkill for those with limited budgets and resources. It's certainly overkill if you don't care about talking to those funny PCs (or Macs) on your coworkers' desks but just want to use their printers.

### No Hablo Printerese

Multiplatform printing seems unfathomable partly because there are so many languages for communicating with printers. The Tower of Babel was nothing compared with an office full of printers speaking QuickDraw, PostScript, TrueType, and PCL.

QuickDraw, the language Macs use to print to non-networkable printers, is also the language they use to draw images on your screen. It draws pictures and text as bit maps, giving instructions to put this dot here, that dot there, and so on.

Unlike QuickDraw, PostScript, the preeminent language in desktop publishing, describes text and graphics mathematically, providing high-quality printouts no matter what the size of the text or graphic. One myth about PostScript is that it's exclusively a Mac dialect. Wrong. PostScript is an international language that Macs, PCs, and even UNIX workstations can use. All Mac applications and many DOS and Windows ones can speak PostScript, enabling Macs to print to PC PostScript printers and PCs to print to Mac PostScript printers — once you've established a connection (more on connections later). QuickDraw is a provincial dialect by comparison, used only by Macs.

Popular PC printer lines, such as the omnipresent Hewlett-Packard LaserJet series, can use PostScript by means of removable font cartridges. If you're not doing high-end desktop publishing, less expensive PostScript-clone cartridges will work too. You can also use PostScript-emulation software, such as Freedom of Press ($495), from ColorAge (508-667-8585), but only if you're not in a hurry. The translation is mind-numbingly slow.

Another myth is that TrueType is a System 7 goody developed by Apple. That's half right. The other half of the story is that it's another universal language, codeveloped by Microsoft, and it's very popular among Windows users. As with PostScript, Mac and PC users can print to each other's TrueType printers once they've made the proper connection (don't worry, I'm getting to that).

Yet another myth would have you believe that printers that speak PCL, the Printer Control Language popularized by Hewlett-Packard, are off-limits to your Mac, because Macs don't speak PCL. Wrong again. You can teach your Mac to speak PCL and other PC printer languages with one of three good packages: the Grappler IIsp ($159), from Orange Micro (714-779-2772); the PowerPrint ($149), from GDT Softworks (604-291-9121); and the MacPrint ($149), from Insight Development (510-652-4115). These packages work with a variety of PC printers by translating QuickDraw commands into something the printer in question can understand.

**Another myth would have you believe that printers that speak PCL or other PC printer languages are off-limits to your Mac. Wrong again.**

The Grappler and the PowerPrint each enable you to print to dozens of laser, dot-matrix, inkjet, and bubblejet printers. In fact, Orange Micro bundles the Grappler with several of its portable PC inkjet printers. The MacPrint is used with laser printers only; it's noteworthy for including FontMapper, a utility that creates bit-mapped screen fonts corresponding to PCL cartridge fonts so you can see PCL fonts on-screen as well as in printouts.

By substituting a bit-mapped representation of the font for the real thing, all three of these utilities let you use TrueType fonts on non-TrueType printers. The PowerPrint and the MacPrint can do the same for Type 1 PostScript — but as with Freedom of Press, make sure you have time on your hands.

### Let's Get Physical

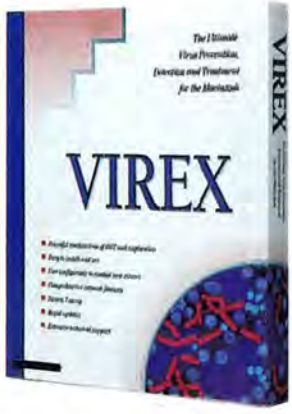
Getting past the real and mythological language barriers solves much of the problem, but you also have to make a connection. You can connect a printer to a single computer or to a bunch of computers. Let's start with the simple one-to-one scenario and work our way up.

***One Mac, One PC Printer.*** The Centronix parallel port is the most commonly used printer interface for PCs. The Mac's printer port, on the other hand, is a serial interface, so the Grappler and the PowerPrint come with a serial-to-parallel

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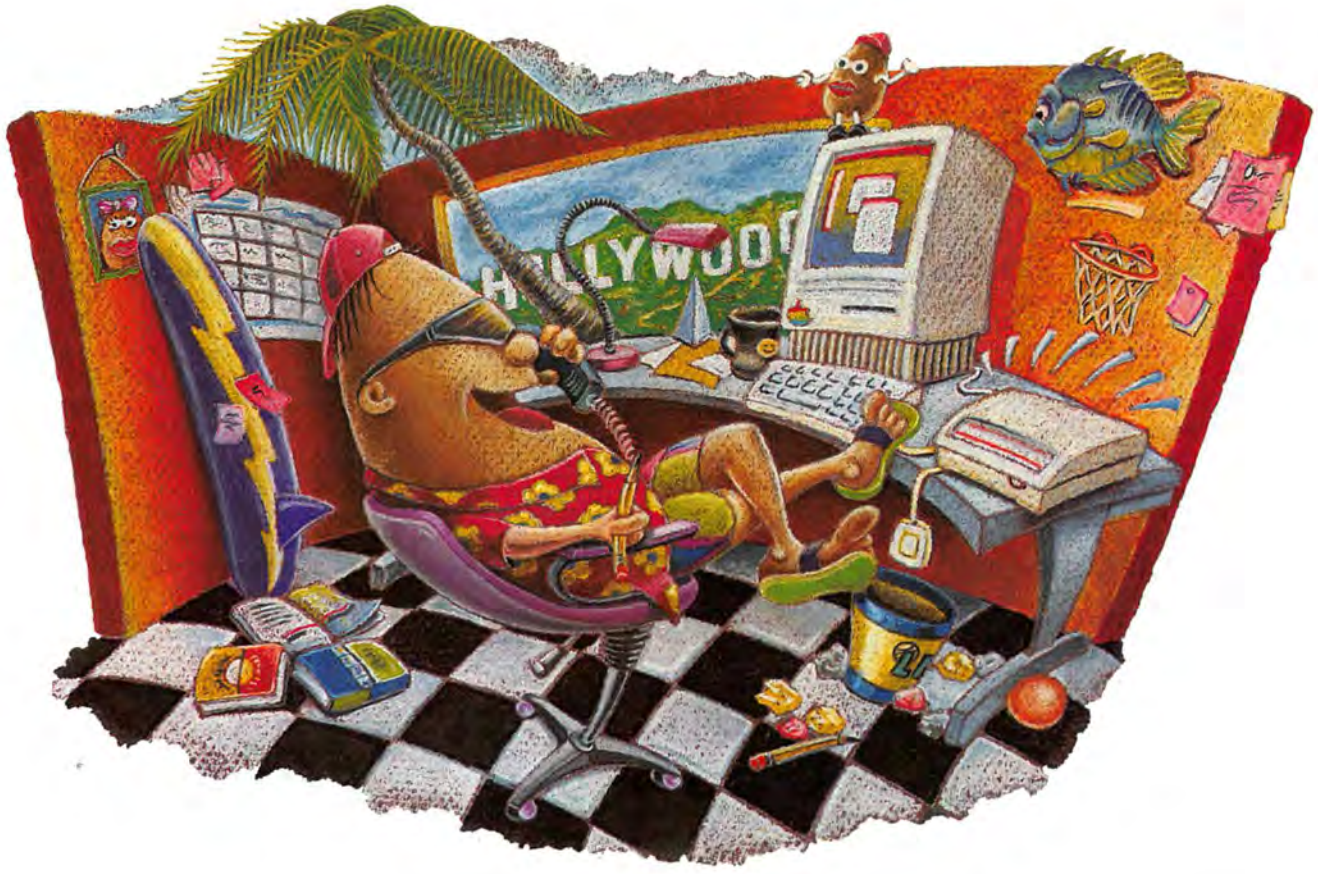
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converter cable — a cable that fortunately doesn't require an external power supply. For those rare PC printers that do not have parallel ports, serial cables are also available with the Grappler and the PowerPrint.

***Printer Sharing in a Box.*** For those who can't hog a printer for themselves, some non-network options enable multiple computers to share printers. Print-sharing devices are boxes with multiple serial ports for PCs or Macs and parallel ports for one or two printers. This type of device is fairly common at PC sites; prices range from a few hundred dollars to about $1,500, depending on the number of connections. One of the best is the BridgePort, from Extended Systems (208-322-7575), a print-sharing device that includes a LocalTalk port for connecting a network of Macs to the box. Be sure to specify BridgePort model ESI-2679C ($595), which recognizes and switches between PCL and PostScript. The BridgePort gives Macs the benefit of a network but leaves PCs hanging on serial cables.

**Contrary to popular myth, AppleTalk on PCs can run on speedy Ethernet as well as on slower LocalTalk hardware, thanks to cards from several popular vendors.**

The next step up is a network comprising both Macs and PCs as well as Mac and PC printers. First, let's take the Mac-centric view, putting PCs and PC printers on AppleTalk — a good approach if you have more Macs than PCs.

***PCs on Mac Networks.*** Adding PCs to AppleTalk gives PC users a connection to Mac printers. Installing AppleTalk in PCs is easy and relatively inexpensive — around $300 to $400 per PC for a network card and software. Contrary to a myth popular in the PC tribe, AppleTalk on PCs can run on speedy Ethernet as well as on slower LocalTalk hardware, thanks to cards from several popular vendors. AppleTalk software comes in the form of PhoneNET Talk ($195), from Farallon (510-596-9100), or COPSTalk ($179), from CoOperative Printing Solutions (404-840-0810). Each of these products gives PC users a Chooser-like menu that lists all the printers on an AppleTalk network and also lists other network services. At press time, COPSTalk had the advantage of supporting Windows. I'll be taking a closer look at these products in a future column.

***PC Printers on Mac Networks.*** You can also put PC printers on AppleTalk networks. A feature of the Grappler IIsp makes a printer connected to any Mac available through the Chooser of networked Macs that have the GrapplerShare extension installed. GDT's PowerPrint/SW does the same thing but at a higher cost ($239). The PowerPrint/LT ($399) uses a special parallel-to-LocalTalk connector/cable to put the printer on AppleTalk without making you connect it to a


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Mac. For real PostScript (at a higher price), you can use the BridgePort.

On the printer end, some HP LaserJet models have an expansion slot that accepts a LocalTalk card. Extended Systems sells a line of such cards that do a good job. One of the most recent, the ExtendTalk board ($745) for the HP LaserJet 4, contains LocalTalk and thin coaxial (10BASE-2) Ethernet and twisted-pair (10BASE-T) Ethernet ports. The Ethernet ports support EtherTalk (that's AppleTalk on Ethernet) and Novell NetWare as well as NetWare Lite, and they support both PCL and PostScript printing.

If you're shopping for new printers, look for units from the platform-correct printer manufacturers that have begun to include both AppleTalk and parallel ports as stock features on their printers. Some printers can even recognize incoming signals and switch between the ports on the fly, a welcome trend in multiplatform printing. Good port-switching laser printers include the Apple LaserWriter IIgx, the Texas Instruments microLaser XL Turbo, and the Compaq Pagemarq.

**Some printers can even recognize incoming Mac or PC signals and switch between AppleTalk and parallel ports on the fly, a welcome trend in multiplatform printing.**

***The PC Network View.*** By now, those who don't have Mac-centric setups are probably saying, "Get real — we're not going to move dozens or hundreds of PCs to AppleTalk." This brings me back to where I started: Novell NetWare, solver of all problems. Or maybe solver of only some problems. NetWare provides the Mac-to-PC connection but does nothing about the language barrier; Mac users still can't print to the legions of PCL printers.

To handle this language problem, you can upgrade all the printers to PostScript or TrueType or use Insight's Mosaic for Macintosh, now being sold by Ungerman Bass and Bitstream. Mosaic for Macintosh is basically the MacPrint software working on a NetWare network. It even includes the MacPrint's FontMapper utility. You can use it with an HP LaserJet II, IID, IIP, III, IIID, IIIP, or IIIsi or any PC printer compatible with one of these LaserJets.

### Novell-Dependent No More

There is no One Big Solution for multiplatform printing. As long as our offices have mixes of operating systems, printer languages, and connection methods, there may never be. But small solutions abound, proving that it is possible to print to other platforms without making offerings to the connectivity gods — at least sometimes.

**John Rizzo is often mythicized as *MacUser*'s technical editor. He is also the author of *MacUser Guide to Connectivity*, published by Ziff-Davis Press.**


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At last! Somebody's figured out how to provide all the functionality of aquarium fish without including a screen saver. The Japanese company 9003inc is developing Aqua Zone, an application that perfectly simulates an aquarium full of tetra, goldfish, catfish, and other scaly stuff. The bad news: If you overfeed them, your fish can still go belly up. The good news: You won't have to flush them down the toilet.

**By James Bradbury**



**This one's on the mouse:** What is it about mice that makes people want to put things on top of them? First came the Corvette Mouse (September '92, page 245). Then there was the Mouse Yoke for flight simulation ("The MacUser 100," December '92, page 124). Now there's Contour Designs' MouseTopper ($19.99), the input-device equivalent of the fiberglass Rolls-Royce front ends that people used to stick onto Volkswagen Beetles. The idea is that you can unscrew the top of the regular Apple-provided mouse and replace it with the larger, more ergonomically correct Topper. Although this might look like a **plastic placebo,** several *MacUser* editors have sworn that they can feel the difference. 415-941-1000.

**Beautiful downtown Burbank:** What time is it? Burbank, a free utility from the Macintosh Consultant's Network, displays as many as four different clocks and, as far as we know, is the first Mac program to be




**inspired by "Laugh-In."** You can configure the clocks however you like and name them after various cities. Best of all, if you name a clock Burbank, it won't keep the correct time — just like its TV namesake. (A workaround is provided for Burbank residents.) 800-729-4626 or 209-545-0569.

**Software for hard times:** A sign of the times, perhaps. A new version (2.0) of Bankruptcy Mac is available for $119. The set of FileMaker Pro templates generates all the necessary forms for filing with the clerk of any U.S. District **Bankruptcy Court.** The publisher (cpo law) assures us that no other bankruptcy program for the Mac comes close to matching this price. Must be a price-sensitive market. 419-695-8480.

**You don't need a weatherman:** Need to know which way the wind blows? Accu-Weather Forecaster, from The Software Toolworks (415-883-3000), provides access to Accu-Data, a dial-in weather database that includes National Weather Service forecasts. More important, it lets you create your own color weather maps (handy if you live in **hurricane country**). In addition to the $39.95 cost of the software, there's a usage fee for the data.

**Just for fun:** Forget about the director's cut of *Blade Runner*. Presto Studios' long-awaited The Journeyman Project, a **CD-ROM time-travel** adventure with stunning rendered graphics, sets the current standard for new Performa 600 CD owners who are looking for something to stuff into that shiny new slot. 619-689-4895. $99.95.








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# No Forwarding Address

*If Apple wants to attract more people to mobile computing, it needs to do better at keeping them connected when they're on the move.*

**By Henry Bortman**



ILLUSTRATION: LYDIA HESS

AppleTalk networks are easy to connect to; it's when you disconnect that the trouble starts.

When Apple invented the AppleTalk network system, it did something very innovative and very clever: It made it possible for a user to connect a Mac to a network and, without any manual configuration (in most cases), begin sharing files and networked printers. No other network system had made that possible before. Many still don't.

But computing has changed since Apple Talk was first developed, nearly a decade ago. It's going mobile. Mobile users are likely to connect and disconnect their computer from their primary network frequently. In fact, they may not have a single primary network: They may have one network they connect to in San Francisco, another in New York, and another in Tokyo. They may even have more than one computer. But wherever they are, whatever computer they're using, they want to be able to get their mail, send and receive faxes, print files, and exchange data with the home office.

I disconnect my PowerBook from the *MacUser* network at least once a day — sometimes four or five times a day. It depends on how many meetings I have. If I remember to log off from my network-based applications manually before I disconnect, no problem. But I'm too old to remember things like that.

More often it works like this: I find a free minute. I sit down at my desk and log on to QuickMail. I open a bunch of messages — let's say 20. My eyes alight on an urgent one about a crisis I have to handle. It's from my boss, informing me about the irate vendor of the week, whose product just got a one-mouse rating. I start to reply. There's a knock on my door. It's my boss, in the flesh this time, summoning me to a weekly planning meeting that I was hoping no one would notice my failure to attend.

As I drag myself away from my electronic window on the world, I glance over my shoulder at the 19 unread messages and promise myself I'll get back to them later. But the meeting turns into lunch, and lunch segues into another meeting, and it's two and a half hours before I return to my office.

Meanwhile, my machine has gone to sleep. I tap the space bar to reactivate it. The 19 messages pop back up on the screen, along with my half-composed reply to message number 1. I finish crafting my response. I go to click on the Send button. But it's grayed out. I can't send my reply. I panic. I realize I've been *disconnected.* I'm no longer communing with my QuickMail server. If I want to send my reply, I have to (1) save it to my local hard disk, (2) log off QuickMail, (3) log back on (dutifully typing in my password — security *is* important, after all), (4) reopen the saved message, and *then* (5) click on the Send button. This is definitely *not* an intuitive, user-friendly experience.

In all fairness, QuickMail isn't the only product with this problem. Several network



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## MOBILE MAC

applications suffer from a similar affliction. Take AppleShare, for example. Suppose your PowerBook is logged on to a file server. You unplug the PowerBook to take it to the conference room, where you're scheduled to do a presentation. When you get there, the volume is still displayed on your desktop. But when you double-click on the icon to open it, you are informed that "The file server's connection has unexpectedly closed."

Apple has taken some steps toward alleviating this problem. Aliases, a feature of System 7, make it easy to remount a shared volume manually if you do get unceremoniously disconnected. For those who are fortunate enough to own one of Apple's newest PowerBooks — the 160, 180, Duo 210, or Duo 230 — AutoRemounter, a new Apple utility that comes with and works on only those machines, provides additional assistance. When you shut down your Mac or put it to sleep, AutoRemounter remembers which shared volumes are mounted on your desktop. It then automatically remounts these volumes when you reconnect your Mac to the same network. Unfortunately, regardless of what kind of PowerBook you're using, if you pull the network plug without putting your PowerBook to sleep or shutting it down first, you're simply — well — disconnected.

### Walk and Run

As long as most people connect to AppleTalk networks with a physical wire or by dialing in with AppleTalk Remote Access, the disconnection problem will remain in the chronic-but-manageable category. There are workarounds for the instances I've mentioned — irritating workarounds perhaps, but workarounds nonetheless. But in the next few years, mobile computing is going to take a leap forward. Technologies such as spread-spectrum radio and diffuse infrared, which make possible on-the-fly wireless network connection and disconnection, will aggravate the problem.

Imagine, if you will, an office building set up with diffuse infrared. Each office and conference room has a transceiver in the ceiling. Walk into a room, and you're connected. Walk out, and you're disconnected. Within a few years, this type of networking will be commonplace. And when wireless networking does become pervasive, you would no doubt be most displeased if every time you walked into or out of a room, you had to log off and back on to all of your network applications. This will be all the more true, because the trend in software is toward networked, workgroup applications, so you'll probably be running more networked applications in the future than you do today.

The next phase, which has already begun, will see application developers finding ways to build support for dynamic connection and disconnection in to their applications. For example, Now Up-to-Date (NUD), a group calendar program, has such a scheme. Even if you leave a group calendar document open on your screen when you disconnect from the network (or put your PowerBook to sleep), when you reconnect, NUD will automatically find the calendar server and update the open document. We may also see third-party developers coming up with generic connection/disconnection utilities that will work across a broad range of applications. But ultimately, this is a problem Apple would do well to solve at the system-software level. That way, all networked applications could take advantage of the feature.

**Regardless of what kind of PowerBook you're using, if you pull the network plug without putting your PowerBook to sleep or shutting it down first, you're simply — well — disconnected.**

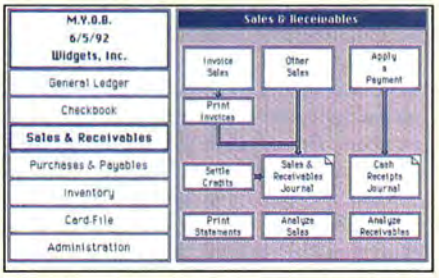
### Hide-and-Seek

Then there's the problem of "Where has that computer gone to now?" The way your PowerBook — or any other computer — communicates with other devices on a network is by establishing an identity, a network address, from which it can send and at which it can receive messages, files, and so on. But just what is your computer's network address if you're constantly moving from one wireless network to another?

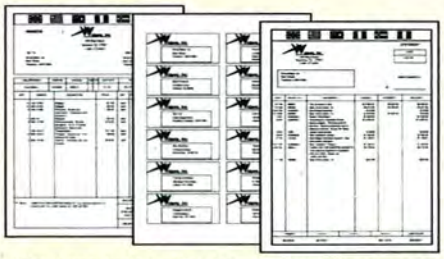
To get some perspective on this problem, let's take a look at some other types of addressing. Postal addresses, for example, describe a particular recipient at a particular physical location. As such, postal addressing provides only minimal

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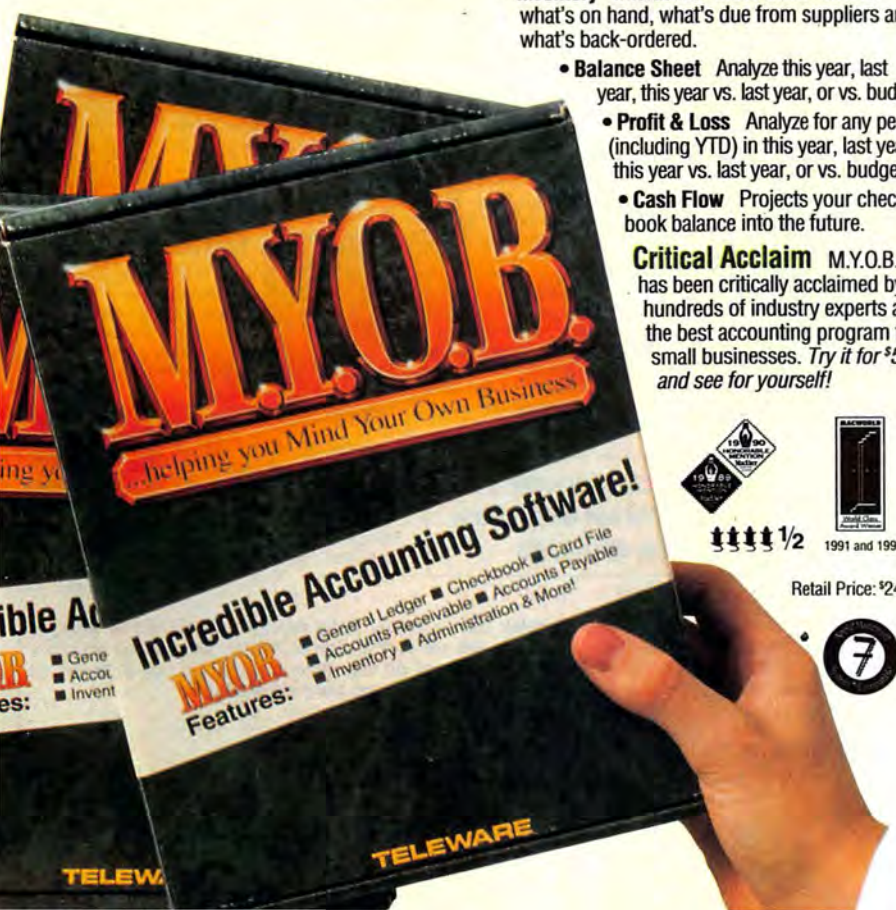
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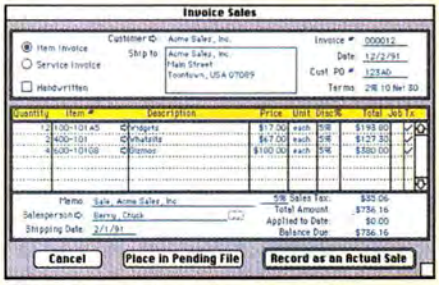
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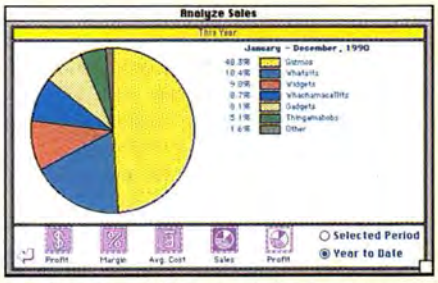



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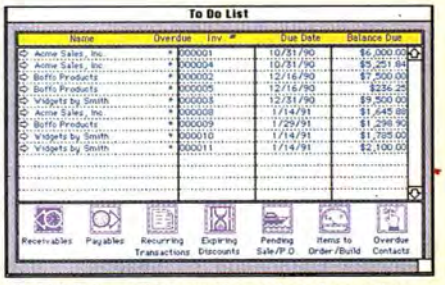
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## TELEWARE

Current Version 3.0– Macintosh System Requirements: Mac Plus with at least 1 megabyte of memory; System 6.0 or later; hard drive with 2 megabytes of free space.

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support for people who move around. If you go on vacation and you know your address on a particular day, you will be able to receive a letter sent to you there (with sufficient allowance for delivery time). Often, however, your mail arrives after you've already moved on. A network set up along similar principles wouldn't make for a very efficient communication system.

How about telephone numbers? These are, after all, a type of address. With the exception of those of cellular phones, phone numbers are much like postal addresses. A land line, the type of phone line you have going into your house, is hard-wired to a single physical location. You have different phone numbers for your home and for your workplace. If you're a mobile worker without a cellular phone and you want to be able to receive phone calls, you need to leave your itinerary with someone, including the times you plan to be at various locations and the phone number at each stop.

Cellular phones are quite different, though. In their case, a phone number is associated not with a wire run to a physical location but rather with a mobile radio transceiver. (You just think it's a phone: Really it's a radio.) This is not a petty distinction. With cellular phones, your "address" travels with you. As you wander in and out of different radio-transmission cells, the circuits and airwaves over which your call gets routed change. But as long as you've got the phone with you and you're in range, wherever you are, you can be contacted by people who have a single phone number — or telephone address, if you will — for you.

What's all this got to do with computer networks? I thought you might be wondering. As computing becomes more mobile and wireless connections become more common, the need will increase for a computer-network addressing system that functions more like cellular-phone numbers than like street addresses or land-line-phone numbers. As you and your computing device move from one wireless computer-network "cell" to another, you'll want to remain connected — to file servers, news wires, electronic-mail systems, databases — and you'll want to be reachable by people who won't necessarily know where you are.

The problem is that none of today's major computer-network addressing schemes work this way. They all work more like street addresses and land-line-phone numbers than like cellular-phone numbers. This is as true for AppleTalk as it is for other systems.

Take System 7 file sharing, for example. You can share a folder from your PowerBook's hard disk as a volume on the network. Another user can then log on to your shared volume and can even create an alias to your volume, to simplify the task of logging on again later. But if you move your PowerBook from one segment of your network to another, the alias will no longer work. That's because your address is hard-wired.

This problem is complicated even more by the fact that you may have more than one computer. And you may want to be


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## Managing piles of information is child's play to Helix Express.

If your personal and business information management needs are simple at the moment, Helix Express is the perfect solution. It can do everything a basic information management program can do, *plus a whole heap more!*

## Helix Express is ready for action right out of the box.

Our family of *Ready-to-Go Solutions* (included) gets you up and running quickly. With them, you can manage:

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- inventory control
- personal contacts
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- order entry and invoicing
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*...and much, much more!*

## Helix Express has the power to grow as your needs grow.

Because it's so easy to use (and because of its amazing flexibility) Helix Express is *the one and only solution* for people who need a flat file database now, and a relational database program in the future.

Now, wait a minute...who said anything about "flat file" and "relational" databases? And what's the difference, anyway?

## Why you really, really should want a program that will do a "whole heap more."

In a flat file database program, you can perform simple functions like searching, reporting, and indexing.

For now, that may be all the capability you need. And Helix Express is the solution.

In the beginning, you might use Helix Express to...

*...keep track of customers.*

As your business grows, you can also use it to...

*...keep track of customers* and *...produce invoices.*



Of course, you'll continue to be more and more successful. And when you are, you can use Helix Express to..

*...keep track of customers*

*...produce invoices* and

*...control your inventory and receivables.*

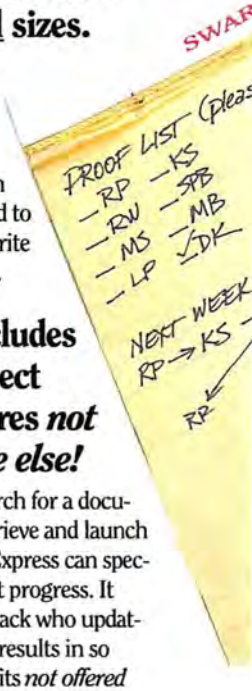
Pretty soon you'll have more and more people working for you (although not as many as you would need without Helix Express).

And guess what? They can use Helix Express, too, because...

*...it's also a multi-user program.*

## Helix Express is the complete database solution for Mac users of all sizes.

It's "kidstuff" for you to start using it! Most relational databases require you to use programming language to design an application. With Helix Express, you don't need to learn a single command or write a single line of program code.




## What's more, it includes document and project management features *not available anywhere else!*

It allows you to store and search for a document by a key word, then retrieve and launch it in its native format. Helix Express can specify workflow and track project progress. It even has version control to track who updated a document, and when. It results in so many more timesaving benefits *not offered by any other database program* that you'll just have to call us to learn more about them!

## Let Helix Express manage your "whole heap of things" now, and in the future.



** Except babies. For that, you're on your own.*

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**CLUE: Make it part of your weekly routine.**
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**CLUE: Remember to warm up and cool down.**
A 5–10 minute session of limbering exercises, such as slow jogging, knee lifts, arm circles, etc., before and after your workout will help make exercise safe and effective.

**CLUE: Stay with it.**
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**The President's Council on Physical Fitness and Sports**



able to access the same information, the same electronic messages, from either one. In this case, the problem isn't solved even if each of your computers has its own cellular-style address. A richer addressing scheme is required. You need an address that identifies *you*, regardless of where you are physically or what computer you're using. Even cellular technologists haven't come up with an answer to this one yet.

**If Apple is serious about wanting to sell you mobile, wireless computing, it's going to have to guarantee that you can stay connected.**

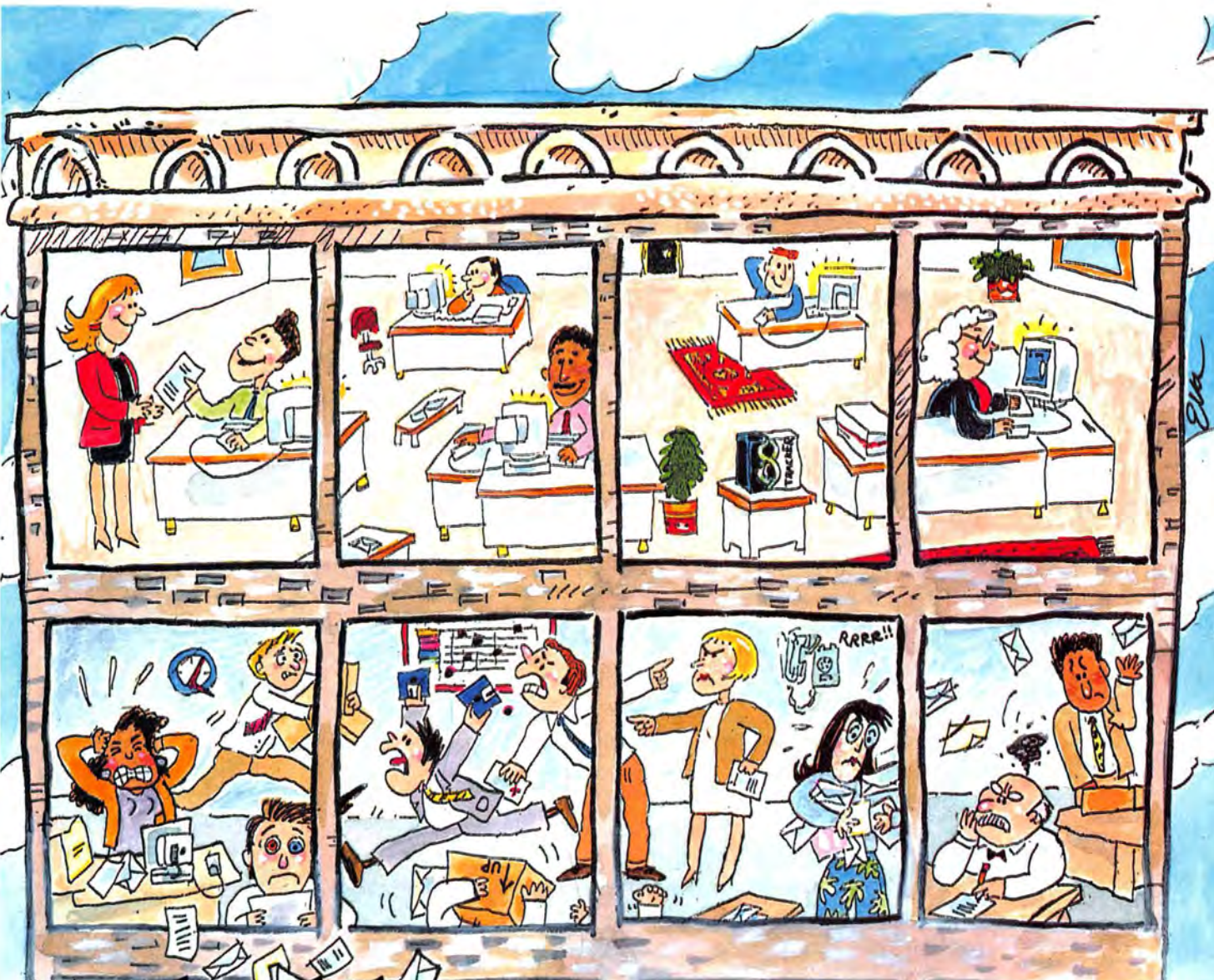
But one thing, hinted at earlier, is clear: If Apple is serious about wanting to sell you mobile, wireless computing, whether it be in the form of PowerBooks or Newtons, it's going to have to guarantee, at the system level, that you can stay connected — and addressable. It will be interesting to see how far OCE (Open Collaboration Environment), a messaging extension to System 7, due sometime in 1993, goes toward resolving some of these problems.

### Printing to Go

Meanwhile, GCC (617-890-0880) recently released its WriteMove II printer. Designed for PowerBook users, weighing in at a mere 2.5 pounds (with the rechargeable battery) and measuring 12 x 3.5 x 2 inches, this $599 printer can produce around 12 to 16 pages on a six-hour charge. Inkjet technology has dominated the low-cost-compact-printer market of late, but the WriteMove II uses a ribbon for imaging. That doesn't mean poor quality either; its 360-dpi engine is capable of near-laser-printer quality.

The WriteMove II ships with ATM and 21 Adobe Type 1 fonts and supports TrueType as well. GCC takes a unique approach to print spooling. Rather than supporting PrintMonitor, a print spooler that comes as part of Mac system software, GCC bundles its own background-printing utility, which provides users with a print-preview function, something PrintMonitor doesn't offer.

**Henry Bortman is *MacUser*'s technical director.**




# Top-level document management.




## Tracker makes mayhem manageable!

***A groupware program that helps you control your work so it won't control you.***

***Helix Tracker: the only document management program of its kind based on the team approach to workflow.*** Tracker was designed specifically to help you work together effectively—to transform chaos into cooperation and collaboration. Designed for workgroups of 4 to 20 people, Tracker allows users in a workgroup to exchange ideas and documents by creating and assigning tasks...and by routing those tasks through the workflow process.

***Tracker improves group productivity by tracking projects' progress as they move from user to user.*** You can check and track a task's status at any time. Maintain a complete audit trail for all tasks. Automatically save each version of a document, then store and retrieve it by key word.

***Helix Tracker allows you to manage documents without forcing you to change the way you work.*** It's application-independent, and is compatible with all Mac applications. Tracker is a productivity-enhancement tool that helps you allocate resources more effectively, improve workgroup accountability and productivity—and meet more deadlines!

***Have you ever wondered where to locate the most recent version of a document? Who created the last set of changes? Whether a job has been reviewed? Or the status of a particular task?*** Helix Tracker gives you the answer to these and dozens of other questions you need to know to control the paper blizzard and work effectively as a team.

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*The End*

Actual facsimile generated from a Silentwriter Model 95fx.

***Our goal at NEC is the complete integration** of computers and communications. The Silentwriter Model 95fx is just one of many innovative products that help us to realize this goal. For example, we not only developed the first notebook computer with a built-in phone and fax, we make satellite dishes capable of sending data worldwide.*

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## How to Buy

# Backup Storage Devices

**All the pundits say the same thing: Back up your data regularly. But if you have large quantities of data to back up, that can pose a problem. Backing up to floppy disks is usually inefficient or downright impossible; better media are tape, removable cartridges, or even another hard drive. Here are some pointers for making sure you get the right backup device for your needs.**

**For more on backing up, see "Magnetic-Cartridge Drives: The Next Generation," January '92, page 126; "Less Is More: Digital Audiotape," October '91, page 116; and "The Best Backup Strategies," October '91, page 206. For information on network backup, see "Overnight Success: Network Backup," August '91, page 112.**

**By Victoria von Biel**

☑ If you back up only small amounts of data — memos, occasional reports and spreadsheets, or data from a personal-finance program — floppy disks may be a valid choice. However, larger quantities of data require you to feed many floppies into your Mac, making backup impractical.

☑ If you have another hard disk at your disposal, you can back up to that. If you keep a System Folder on this hard disk, you can also boot from it if your primary hard drive fails. The drawback is that hard disks have a fixed capacity: When you fill one up with data, you either have to start erasing data or move to another medium.

☑ Tape is a convenient and very economical medium for backing up moderate to large amounts of data. Choose DAT (digital audiotape) — ideal because each cassette can store 1.2 to 2 gigabytes of data and drives are fairly moderately priced — or 8-millimeter videotape (as much as 2.2 gigabytes) and data cassettes such as TEAC 150 cassettes (as much as 150 megabytes).

☑ Although tape is inexpensive, holds a lot of data, and takes up little storage room, you cannot boot from DAT or other tapes and restoring data is slow.

☑ Tape is the best medium for short-term archiving. As it gets old and is used repeatedly, tape — like all magnetic media — loses its data. Unfortunately, it's almost impossible to rescue data from a damaged cassette.

☑ You will need special software if you decide to back up to tape. Most products include such software, but the quality varies. A good third-party backup program that can be used with a variety of backup media is Dantz Development's Retrospect, which is included with some drives.

☑ Look for software that does file-by-file backups, in which individual files are stored on tape as separate entities and you can restore whatever files you need. Avoid programs that perform image backups only, requiring that you restore the entire contents of your hard disk rather than specific files.

☑ Try out the software — it should be both simple to use and able to perform unattended backups.

☑ Magnetic cartridges (such as SyQuest and Bernoulli cartridges) can hold 40 to 90 megabytes of data and can double as startup devices. These cartridges must be treated with care, however, because rough handling can damage them. Bernoulli cartridges tend to be more stable than SyQuest ones.

☑ Although you'll probably receive a free cartridge when you buy a magnetic-cartridge drive, you'll need to buy several more over time. A 45-megabyte removable cartridge costs about $65. Cartridges are not necessarily interchangeable among drives, so find out which cartridge is compatible with yours.

☑ For the sake of convenience, look for magnetic-cartridge drives that let you mount the drive either vertically or horizontally (for more efficient use of desktop space) and that have extra AC outlets on the back panel (to avoid cord clutter).

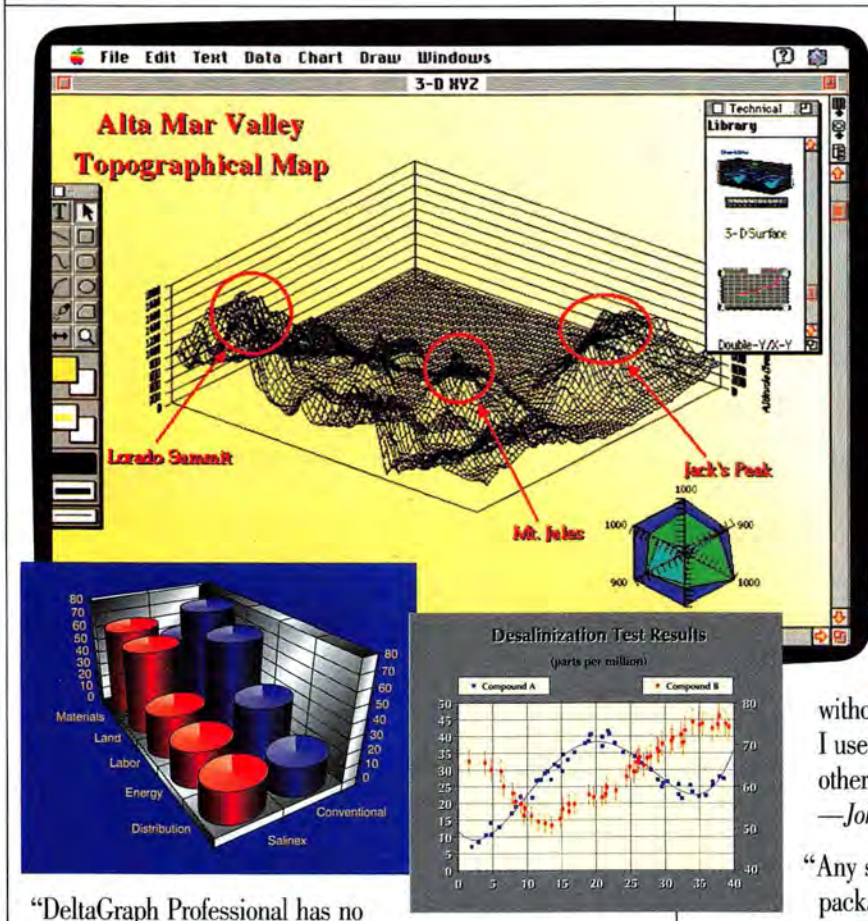
☑ If you need to back up your files for long-term storage, a magneto-optical drive is your best bet. Optical cartridges are a very stable medium, with a shelf life of approximately ten years. What's more, the medium is inexpensive, although magneto-optical drives are still expensive.

☑ For the best security, make more than one backup and store one copy off-site in a fireproof compartment.

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"I am impressed with the range of things DeltaGraph Pro does. It's the only product on the market that addresses all complex charting needs. DG Pro is one hot product."
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"Feature for feature, DeltaGraph Professional is the best general-purpose business and technical charting program available for the Macintosh."
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MacUser - June, 1992 March 23, 1992

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Carpal-tunnel syndrome, headaches, repetitive-strain injuries, bad back, blurred vision — the list of painful injuries your Mac can inflict on you is long. Fight back with the *VDT News' Sixth Annual VDT Product Directory* ($15), which lists almost 200 companies that sell ergonomic products. Or get a subscription to *VDT News* (you'll get the directory free). It's *the* publication for keeping abreast of computer-related health-and-safety issues. 212-517-2802. $87 per year.

**By Victoria von Biel**



**Command Performas:** If you want to turn your new consumer Mac into a **fasta Performa,** note that DayStar Digital has added support for both the Performa 400 and the 600 to its Universal PowerCache, bringing to 12 the number of Macs supported by this versatile CPU accelerator (take it with you when you move up to your next Mac). You can plug the PowerCache directly in to the 600's accelerator slot; you need a $49 adapter to use it with the 400 (and all other Macs except the IIci, which doesn't require an adapter). Prices range from $649 for a 33-megahertz accelerator to $1,599 for a 50-megahertz PowerCache with a 68882 math chip. 404-967-2077.



**Remote control:** Here's something for the Wizard of Oz — Mac Extend from Presentation Electronics. It lets you use a keyboard, mouse, or other ADB device from as far as 1,000 feet away from your Mac (from **behind a curtain,** perhaps?), so you're not tied to your Mac during a presentation. The Mac Extend Plus goes one better, offering a hand-held remote control that lets you issue keyboard and mouse commands from as far as 40 feet away. Of course, freedom has its price — the Mac Extend Plus costs a hefty $849, and the Mac Extend is $699. 916-652-9281. For those who need to remotely boot a roomful of Macs (in a lab or classroom, for example), Sonic System's The Diskless Mac has just been upgraded to speed up the whole process. TDM ($149) lets you create diskless workstations on your network so you can control what files users can access. 408-293-8600.




**When the going gets tough:** The tough go on-line. Need to fit in a little last-minute holiday shopping? LA Online is a free on-line service that offers many of the same shopping services found on CompuServe, America Online, and Prodigy. To buy such things as software, hardware, books, CDs, wine, roses, contact lenses (a **nerd's dream date?**), all you need is a modem and a credit card (although if you're outside the LA area, you'll also pay for a toll call). To try it out, have your modem call 310-372-4050. Or you can call 310-372-9364 for more information. Get a handle on all of the shareware available from on-line services, with *MacUser* contributing editor Greg Wasson's new book, *The MacUser Guide to Shareware,* from Ziff-Davis Press. More than 400 programs are listed, and a free accompanying disk contains eight of the most outstanding ones. 510-601-2000. $34.95.

# Word Power

**By Marianne Carroll**

How much did you pay for your word-processing software? $200? $400? Chances are you're using only about 10 percent of the power you paid for. Many Mac users still think of their favorite word processor as an electronic cousin of the typewriter and haven't discovered how their software can automate document formatting.

If you rely on the space bar, Return key, and Tab key to painstakingly format your letters, memos, and reports, take a look at the following ten tips, and you'll discover how most word-processing packages can make the process a lot easier — and faster. Most of these tips work with the major word-processing packages. And once you've started exploring your software's special functions, you're bound to discover more techniques that will streamline document creation.

Before you start, you need to take two basic steps. First, display the ruler in your document; in most programs, when you do so, you also open up a whole toolbox of formatting shortcuts. Some word processors automatically display the ruler; if that's not the case with your program, you can usually find a command on the View, Layout, or Format menu that makes the ruler visible.

The next step is to select Show Invisibles or Show ¶ from your program's View or Edit menu so you can see all the nonprinting character symbols, such as spaces, returns, and tabs, within your document.

**Marianne Carroll is the author of *Marianne Carroll's Super Desktop Documents* (New York: Brady Publishing, 1992).**

### Centered Text

If you've been using the space bar to center text for letterhead, now's the time to use your word processor's ruler. Delete all the spaces to the left of the actual text, select the text you want centered, and click on the centered-text icon on the ruler (your word processor may also have a menu command for centering text) to center the selected text between the left and right margins.

### Left Indent/Right Justify

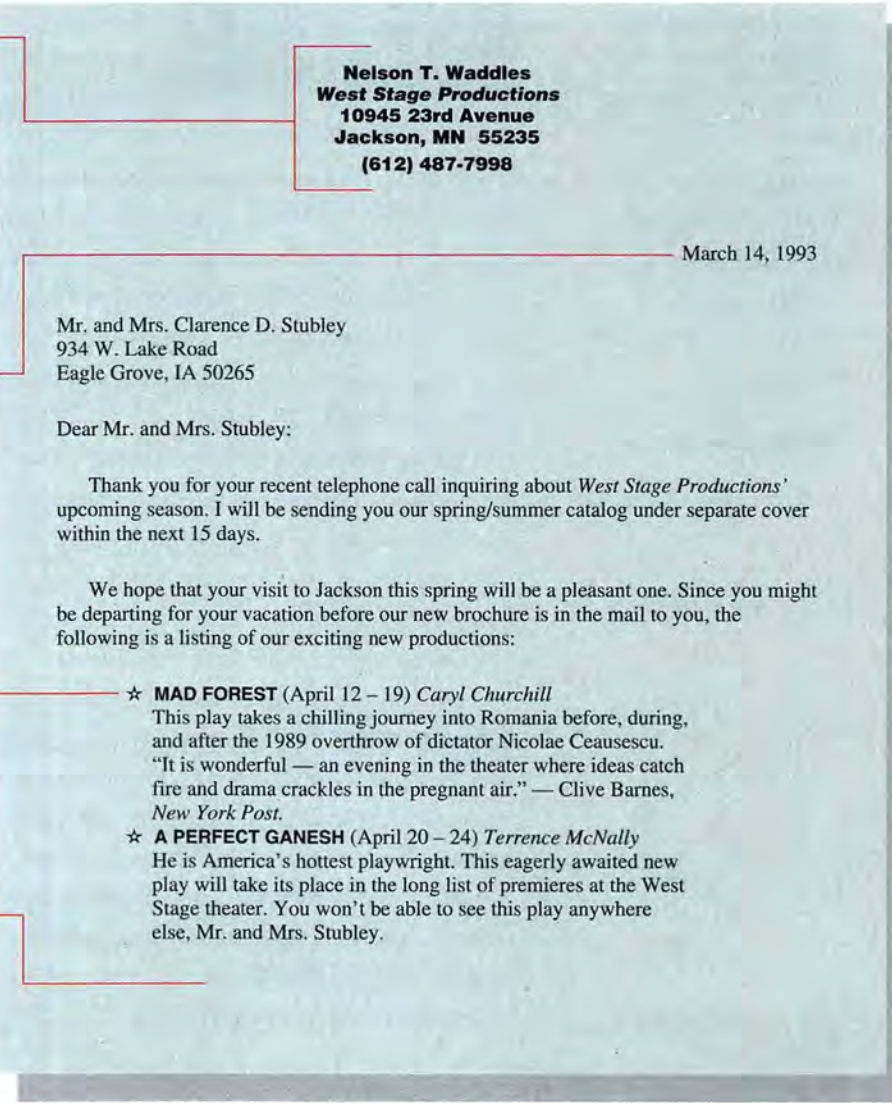
There are a couple of ways to place a date or other information on the right side of the page besides using the space bar and eyeballing the position. One method is to select the text you want to move and drag the ruler's left-indent marker to position the text. You can also select the text and choose the right-justify icon on the ruler, which lines the text up with the page's right margin.

### Bullets

Press Option-8 to create a bullet (•), or select the Zapf Dingbat font and choose a special character for a decorative bullet at the beginning of your regular text. (Use the KeyFinder DA to look at the special dingbat characters.)

### Page Breaks

Instead of inserting extra returns to move a paragraph of text to a new page, insert a page break. In most programs, the Page Break command is on the Format, Layout, or Insert menu.



**Nelson T. Waddles**
***West Stage Productions***
**10945 23rd Avenue**
**Jackson, MN 55235**
**(612) 487-7998**

March 14, 1993

Mr. and Mrs. Clarence D. Stubley
934 W. Lake Road
Eagle Grove, IA 50265

Dear Mr. and Mrs. Stubley:

Thank you for your recent telephone call inquiring about *West Stage Productions'* upcoming season. I will be sending you our spring/summer catalog under separate cover within the next 15 days.

We hope that your visit to Jackson this spring will be a pleasant one. Since you might be departing for your vacation before our new brochure is in the mail to you, the following is a listing of our exciting new productions:

☆ **MAD FOREST** (April 12 – 19) *Caryl Churchill*
This play takes a chilling journey into Romania before, during, and after the 1989 overthrow of dictator Nicolae Ceausescu. "It is wonderful — an evening in the theater where ideas catch fire and drama crackles in the pregnant air." — Clive Barnes, *New York Post.*

☆ **A PERFECT GANESH** (April 20 – 24) *Terrence McNally*
He is America's hottest playwright. This eagerly awaited new play will take its place in the long list of premieres at the West Stage theater. You won't be able to see this play anywhere else, Mr. and Mrs. Stubley.

### First-Line Indent

You can avoid using spaces or tabs at the beginning of the first line of each paragraph by creating an automatic first-line indent. To do so, delete any extra spaces at the beginning of each paragraph and drag the first-line indent marker on the ruler as far as you want, to automatically indent the first line of text for each paragraph. Now whenever you press the Return key, the word processor automatically indents the first line of the new paragraph.

### Header Text

If you have text that repeats on each page (page numbers, titles, or dates), use the Header command. To prevent the header text from appearing on the first page, here's how a few programs let you do so: In Microsoft Word, use the Section command, on the Format menu, and click on the Different First Page option; in MacWrite, click on the Title Page option, on the Format menu; in WordPerfect, after you've inserted a header, click on the first page and then go to the Layout menu and choose the Suppress Format option for the header; in WriteNow, click on page 2 and then choose Insert New Header on the Format menu.

### Hanging Indents

Need to inset text such as quotations or bulleted text? Using hanging indents eliminates the clunky, frustrating method of using returns, tabs, and spaces to line up text. First, highlight the text you want to indent. On the ruler, drag the left-indent marker to about the .5-inch mark. Next, drag the first-line indent marker to the .25-inch mark. If you're entering bulleted text, after you insert the bullet character, press the Tab key. This aligns the text on the first line with the text beneath it. (Note: If you're using WordPerfect, you must place a Tab marker at the same position as the left-indent marker.)

March 14, 1993 Page 2

☆ **PUTTING IT TOGETHER** (April 25 – 30) *Stephen Sondheim*
With each new musical, Stephen Sondheim practically reinvents the form. *Putting It Together* takes the best of Sondheim's ground-breaking efforts and weaves them together into a single night of incomparable entertainment. It's the perfect evening for students of the musical, devotees of Sondheim, or fans of an unforgettable night on the town.

Tickets are only $17 or $25 per performance, or purchase a three-play subscription series (see the table for prices and dates). We'll be happy to take your order by fax or by phone, and you can charge your tickets to a major credit card by calling our offices any day Monday through Friday between 10 A.M. and 5 P.M. Your tickets will be held for you at our box office.

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|---|---|---|
| Series A | Tuesday evenings | $47.50 |
| Series B | Saturday evenings | $75.60 |
| Series C | Sunday matinees | $65.75 |

We all look forward to seeing you here in Jackson this spring at our theater.

Yours truly,

Nelson T. Waddles
Artistic Director

NTW/wp

### Automatic Page Numbers

To number the pages in your document automatically, click on the auto-page icon in your header, or while you're in the Header window, choose the Insert Page Number command from the Edit or Format menu.

### Space Between Paragraphs

To automatically get a blank line between paragraphs, you can use the Paragraph dialog box in most programs so you don't have to press the Return key a second time (T/Maker's WriteNow does not have this feature). The settings vary among applications: Some let you place a space above or below each paragraph. (Hint: You can narrow the space between paragraphs if you find you need to fit more text on a single page.)

### Tables

If your word-processing program doesn't have a table function (or if you just want to create a small, simple table), use tabs rather than spaces to line up the columns. Use decimal tabs to line up columns of figures.

# Every Mac Deserves Big Color

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| SE/30 | ✦ | ✦ | ✦ |
| Performa 400 | ✦ | ✦ | ✦ |
| Performa 600 | ✦ | ✦ | ✦ |
| Mac II/Quadra | ✦ | ✦ | ✦ |

ProColorServer display cards are available in 8-bit, 8•16-bit, and 8•16•24-bit versions, and support monitors from 13" to 21", with resolutions ranging from 640 x 480 to 1152 x 872. Lapis also offers a full line of DisplayServer™ and PowerBase™ monochrome display adapters for all Mac systems ranging from the Plus to the Quadra.

**CIRCLE 124 ON READER SERVICE CARD.**

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# How to Get a MacUser Index

*If you're like most* MacUser *readers, you save back issues. They're an invaluable reference source, but until recently, there was no easy way to look up old articles.*

**By Ben Templin**

In 1992 *MacUser* published approximately 500 articles about more than 1,000 products. That's around 700,000 words in more than 2,400 pages — a lot of information to thumb through if all you're looking for is the review of that utility that organizes your System Folder. There's got to be an easier way.

There is. The MacUser/MacWEEK Index catalogs more than 7,000 articles that have appeared in these two magazines since 1987. It's available only through ZiffNet/Mac, the on-line service for *MacUser* and *MacWEEK*. The index is free of charge as part of the monthly $2.50 membership fee.

### An Alternative to On-Line

If you don't want to deal with an on-line interface, you can download the MacUser Index as a HyperCard stack. To keep the size of the stack within reason, the HyperCard index carries entries for 1992 only and for *MacUser* alone. Although the on-line MacUser/MacWEEK Index is updated monthly, the MacUser Index HyperCard stack is updated just once a year.

Any CompuServe subscriber can access ZiffNet/Mac by typing GO ZMAC at any ! prompt. If you don't belong to CompuServe, you can join ZiffNet/Mac by following the instructions in the masthead in this issue.

To download the index, get on ZiffNet/Mac and type GO DOWNLOAD. Download the file MUINDX.SEA.

### How the Index Works

The MacUser/MacWEEK Index lets you search by product, company, and topic. It delivers a citation with the issue date, page numbers, title, and author. Searching by topic can sometimes reveal more articles than you'd care to deal with. For instance, the term *desktop publishing* yields 727 articles published since 1987. You can narrow a search to a smaller set by using the same three main search criteria. Further defining *desktop publishing* with the topic *layout* gets the count down to 42 articles. The most recent articles are listed first. (Tip: If you want to separate the reviews from the news for a certain topic, then narrow by topic with the term *evaluation.* This keyword is used consistently to differentiate a review from a news story.)

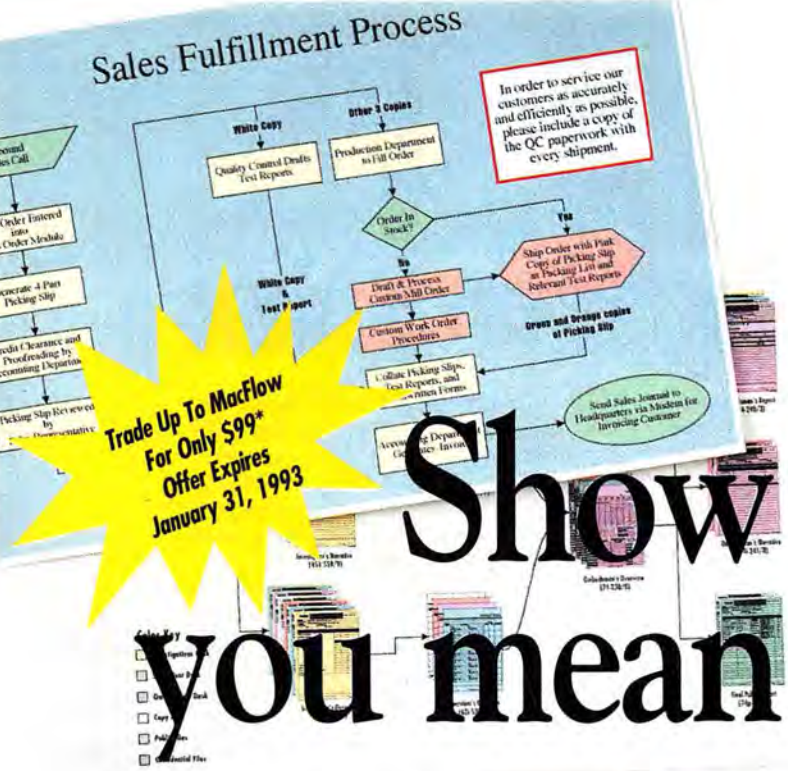
### Terminal Emulation

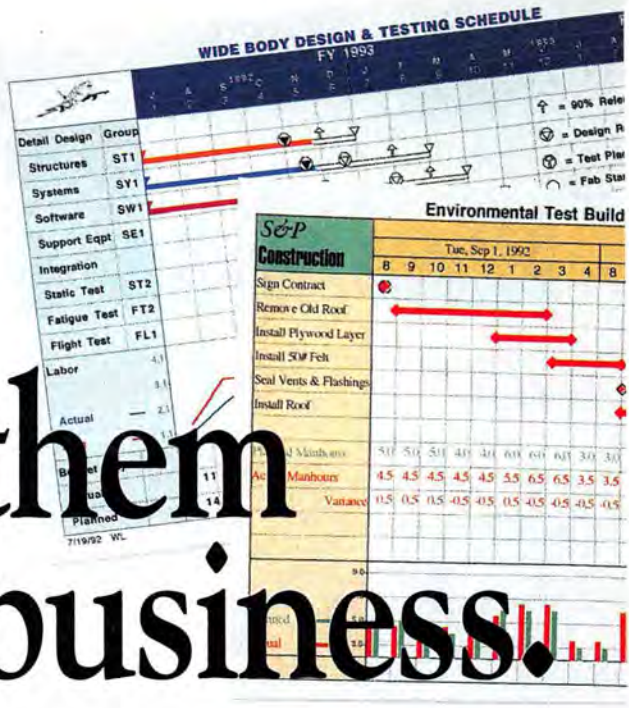
Neither of the CompuServe Mac interfaces — Navigator or CIM (CompuServe Information Manager) — is optimized for CompuServe's Terminal mode, so follow these tips if those are the programs you use. In Navigator's case, you have to add a manual tile and interact with the index in real time — a concept foreign to most Navigator users. Add a manual tile with a GO code of ZMC:INDEX. Consult your handbook if you have questions on how to use manual tiles.

Although CIM is a good graphical interface for forums, the interface for databases such as the MacUser/MacWEEK Index is a terminal emulator. As with most terminal emulators, you can save only a limited amount of information to the buffer, so it's important to capture data as a text file. To do so, select Capture to a File from CIM's Terminal menu, which brings up an Open dialog box. Click on the New button, and you get a Save dialog box that lets you define a file in which to save the text.




**The MacUser Index, the HyperCard version of the MacUser/MacWEEK Index, contains a year's worth of article references. It's available only through ZiffNet/Mac.**

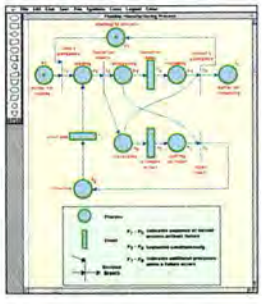



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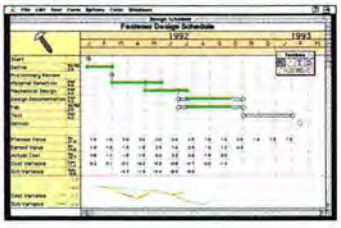
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# Free and Easy

*Here are 16 shortcuts that not only reveal System 7's finer features but also increase your productivity — and you don't have to spend a dime.*

**By Bob LeVitus**




I didn't invent any of the tips, techniques, or shortcuts I'm about to describe. Some of them I've revealed before in this very space; others have been sent to me by readers and other Macintosh aficionados. But wherever they came from, my guess is that most of us can use some reminding now and then of System 7 possibilities that aren't immediately obvious.

I promise that each of these techniques will save you time and effort, but only if you use them. Because you'll use them only if you try them, I recommend reading this column at your Mac and trying each technique as you read about it.

### Kind of a Drag-Launch

One of my favorite System 7 features is drag-and-drop file launching. Here's how it works: Just drag the file you want to open onto the icon of the program you want to launch it with (or an alias of that program). If the program is capable of launching that file, you'll see that the color of its icon inverts, and when you release the mouse, the program opens the file. It's simple, elegant, and an incredible time-saver. System 7 has many improvements, but this is definitely one of my all-time faves.

Here are some suggestions for how you might use it:

• If you drag the icon of a TeachText file onto the icon of your word processor (or an alias of it), the file will open in your word processor. Because I like Word and hate TeachText, I do this all the time. (By the way, this trick also works when the application is already open, which is great for me, because Word is usually running on my machine.)

• You know how screen dumps — pictures of your Mac screen you create by pressing Command-Shift-3 — are automatically saved to disk as PICT files? Well, unfortunately, when you double-click on a screen dump, it launches TeachText. I don't like to use TeachText, so I usually drag screen-dump icons onto an alias of Photoshop or DeskPaint for editing.

• When you double-click on a file and receive the dreaded "An application can't be found" alert, try dragging the document onto the icon of your word processor or graphics program. As often as not, you'll find that the file will launch.

• To make drag-and-drop even better, place aliases of your favorite programs right on your desktop. My desktop features aliases of Word (which opens most word-processing formats), DeskDraw (to open PICTs), DeskPaint (to open files in PICT, MacPaint, and TIFF formats), Amazing Paint (for MacPaint format), StuffIt (for .SIT and .CPT formats), Photoshop (for most graphics formats), and ResEdit (which launches any file you drag onto it, regardless of the file's creator or type). I rarely come across a file I can't launch by dragging it onto one of the aliases I keep on my desktop.




POWER TOOLS

# BEATING THE SYSTEM

### The Apple Menu

The Apple menu is a great place to store frequently used applications, folders, and files, but organizing its contents can be tricky if you keep a lot of stuff in it. There are plenty of commercial products to help you organize the contents of the Apple Menu Items folder (HAM and Now Utilities, to name a couple), but there's a way to do it for free.

The following tip comes from John Catalano, president of Casa Blanca Works, which makes Drive7 and Blue Parrot. He has devised a unique way to organize your Apple menu, using absolutely no additional software (see Figure 1). All you need to know is the order in which ASCII characters are alphabetized (sorted) by your Mac and that the items in the Apple Menu Items folder appear on the Apple menu in ASCII alphabetical order. Here's how it works:

Spaces sort first, so the first item — Tools — is preceded by two spaces. In the next group, each item — Blue Parrot, Chooser, Control Panels, and Find Pro — is preceded by one space.

Space-caret (Shift-6) is next in the sorting order, so a space followed by a series of carets creates the first separator.

Space-bullet (Option-8) comes next, so a space followed by a bullet precedes the names of all the telecommunications programs.

Then comes the hyphen. The second separator is a series of hyphens with no preceding spaces.

The arrows that precede the next group — Compact Pro, DiskCopy, Microsoft Excel, and WriteNow — are made with a hyphen followed by a right angle bracket.

The next separator is a row of equal signs, and the items in the last group have nothing preceding their names, so they always come at the bottom of the list.

The clock icons used for the separators are just renamed aliases of the Alarm Clock DA.

With a little experimentation, you should be able to use this technique to organize your Apple-menu items into groups that make sense to you.




**Figure 1: Simply by knowing how the Mac sorts items in the Apple Menu Items folder, you can customize the Apple-menu layout to suit the way you work.**

### Aliases and More Aliases

Aliases are probably the greatest improvement System 7 provides. An alias, for those of you who are new to System 7, is a tiny 1K or 2K file that points to the original file. When you open an alias, the original opens. You can have as many aliases of a file as you like.

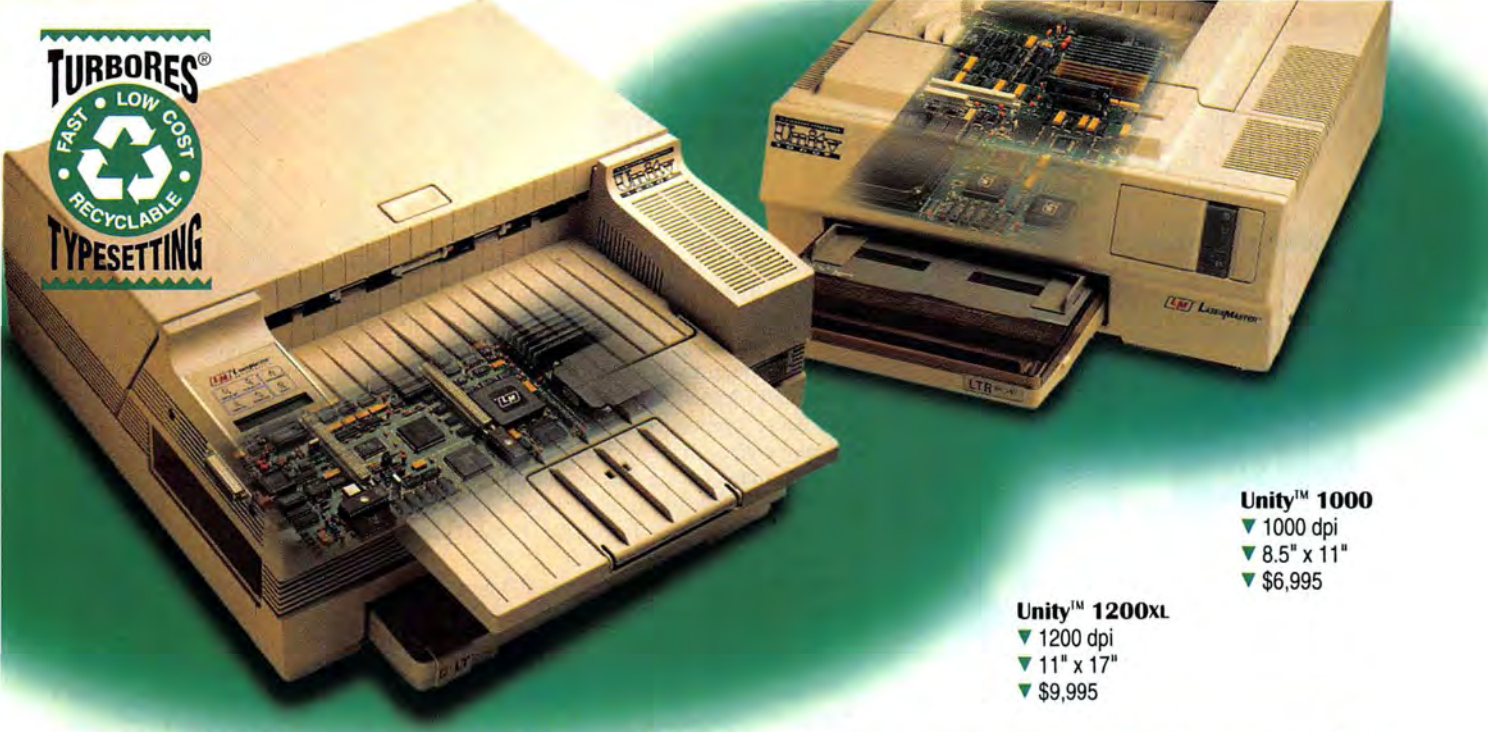
Creating an alias is easy: All you need to do is select the file you want to create the alias for, go to the Finder's File menu, and choose Make Alias. Then move the alias to the desired location. (*MacUser* has developed several utilities, such as Alias Creator, Alias Assassin, and Alias Stylist, that help you manage your aliases more efficiently. They're all available on ZiffNet/Mac.)

Aliases are a boon for organizing your hard disk. Say you create a memo to the marketing department about Client X. Do you store it in the Memo folder, the Marketing folder, or the Client X folder? With aliases, you don't have to decide — you just store the actual file wherever you like and put aliases in the other two folders. Then you can find and open the memo no matter which of the three folders you look in.

There are dozens of ways to use aliases to make your life easier. Here are some of my favorites:

• Keep aliases of files and folders you

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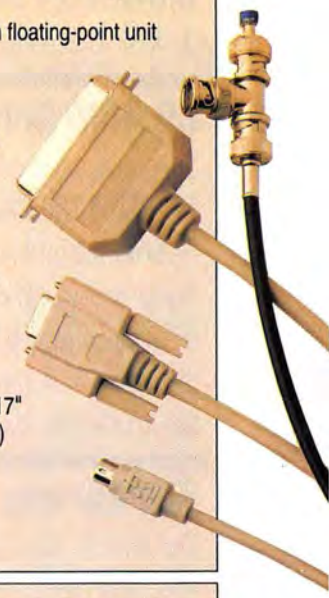
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**MARCH AD CLOSE: Friday, December 18, 1992**



# BEATING THE SYSTEM

use every day on the desktop or in the Apple Menu Items folder (or in both). On my desktop, I keep aliases of folders for current projects as well as for the applications I use often. Even though the actual folders and files are buried three or four levels deep, I can launch any of them with one double-click on the appropriate desktop alias. Items on the desktop are also easy to find when you're in an Open or Save dialog box — just click on the Desktop button, or type Command-D.

• Keep an alias of the Apple Menu Items folder somewhere convenient — on the desktop or inside the Apple Menu Items folder itself. This lets you add files and folders to the Apple menu by simply dropping them into the folder; conversely, you can get to the folder without having to wade through the System Folder to find it.

• Keep an alias of the Apple Menu Items folder in the Startup Items folder so that it opens automatically at startup. This gives you two ways to access items in the Apple menu — you can use the mouse to choose them from the Apple menu itself, or you can use either the mouse or keyboard command equivalents to select them in the Apple Menu Items folder, which is open on your desktop.

• If you're on a network and frequently access an AppleShare volume or a shared folder on another user's Mac, make an alias of that volume or folder. Then whenever you need to get at that folder, all you have to do is double-click on its alias to mount the folder; you don't have to go to the Chooser first.

• Another great network alias trick is the so-called office on a floppy disk, which lets you use a floppy disk to access your Mac from any other Mac on the network that's running System 7.

First create an alias of your hard disk, and copy it to a floppy disk. In the Sharing Setup control panel, turn on File Sharing. To make your hard disk available on the network, select it and choose Sharing from the Finder's File menu. In the Sharing dialog box, click on the "Make all currently enclosed folders like this one" box and then set up the appropriate access privileges.

Then you can mount your hard disk from any Mac on the network by inserting the floppy disk containing the alias and double-clicking on your hard disk's alias.

• Aliases can locate files stored on floppy disks or removable media such as SyQuest or Bernoulli cartridges or optical discs. Here's how it works:

Insert the removable medium (SyQuest or Bernoulli cartridge or optical disc), and give it a memorable name, such as Disk 1. Copy the file (File 1) from your hard disk to Disk 1, and make an alias of the file. Copy the alias of File 1 from Disk 1 to your hard disk. Put it in an appropriate place. Eject Disk 1, and store it in a safe place.

The next time you need to use File 1, double-click on its alias on your hard disk, and you'll see a message on-screen asking you to insert Disk 1.

Aliases are handy critters, and I'm willing to bet that you out there in readerland have plenty of unique ways to use them. So have I got a deal for you: Send me your favorite alias tricks; if yours is cool enough (and I haven't heard it before), I'll print it in an upcoming column and send you one of my coveted "I Beat the System" T-shirts.

### Your Saving Grace

We all spend a lot of time in Open and Save dialog boxes — which is why I'm so tickled that System 7 lets you use them without making you grab the mouse. Almost every function in these dialog boxes has a keyboard shortcut. Here are the ones I use most (these all work in both the Open and the Save dialog boxes):

• Command-period is the same as clicking on the Cancel button.

• Command-right-arrow takes you to the next disk or volume, and Command-left-arrow takes you to the previous one.

• Command-down-arrow takes you into the selected folder.

• Command-up-arrow takes you up one level of folders.

• Command-D takes you back to the desktop.

There's one more that works only in Save dialog boxes: The Tab key toggles between the scrolling list of files and the filename field.

Try it. You'll like it!

As always, submit your favorite System 7 tips either by mail or by modem in ZiffNet/Mac's MacUser Forum (please include your name and mailing address). If you submit the month's best tip, you'll not only receive notoriety and fame but you'll also get a spiffy (and rare!) "I Beat the System" T-shirt.

**Bob LeVitus is the author of *Dr. Macintosh's Guide to the On-line Universe* and lots of other stuff.**

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# Upgrading the Mac SE/30

**What do you do if you've got an original SE/30 whose screen is starting to flicker: Repair it or bag it? Your SE/30 is worth about $1,500 today; in comparison, a used PowerBook 140 (which is more portable) or a IIcx (which has more slots) delivers the same performance and costs about the same. A new PowerBook 170 or IIci will roughly double your performance — and your cost. How you use your Mac will determine whether you need to trade up or just make the most of what you have.**

**By Bob Brant**

SE/30s tend to age gracefully. Any **required repairs** are most likely to be to the power-supply modules or the disk drives. If your power supply fails, you may notice a shrinking screen. If you can pinpoint the offending part and know how to remove and replace whatever is causing the problem, the repair can run less than $150 and take only a few days. Having a technician repair the damage can set you back $500 or more. Your local Apple dealer is the best place to start looking for repairs. Check the back pages of magazines such as *MacUser* and *MacWEEK* for the name and location of other service centers.

If you decide to upgrade your SE/30, first add more **memory.** The SE/30's eight SIMM sockets can accommodate as much as 128 megabytes of RAM, in various combinations of 1-, 2-, 4-, 8-, and 16-megabyte SIMMs rated at 120 nanoseconds or faster. Prices start at $30 for 1-megabyte SIMMs. To access more than 8 megabytes of RAM, use Connectix's MODE32 (free from on-line services and user groups).

Adding a **larger hard drive** — don't consider less than 100 megabytes — lets you store more data and get to it faster. The fast Quantum 3.5-inch models come in a variety of sizes, from 105 megabytes to 525 megabytes, and start at $359 for an internal drive (external drives typically cost $100 more). If you need even more capacity, investigate Fujitsu's 520-megabyte, Maxtor's 540-megabyte, Toshiba's 830-megabyte, Seagate's 1.2-gigabyte, and Hewlett-Packard's 1.2-gigabyte 3.5-inch drives.

For speed, the combination of a **50-megahertz accelerator** and the SE/30's 9-inch screen is awesome — especially considering that you can carry the SE/30 to a remote site. DayStar Digital offers 33-, 40-, and 50-megahertz 68030 SE/30 PowerCache accelerators with or without a 68882 FPU (floating-point unit), starting at around $650.

A **larger monitor** lets you put more information on a larger screen and get to it faster. Lapis offers SE/30 plug-in boards starting at $299 and monochrome portrait monitors starting at $599. A large color monitor and card costs the better part of $2,000. DayStar's SE/30 PowerCache accelerator leaves the SE/30 PDS (processor-direct slot) free, so you can add video (or Ethernet) cards and enjoy acceleration too.

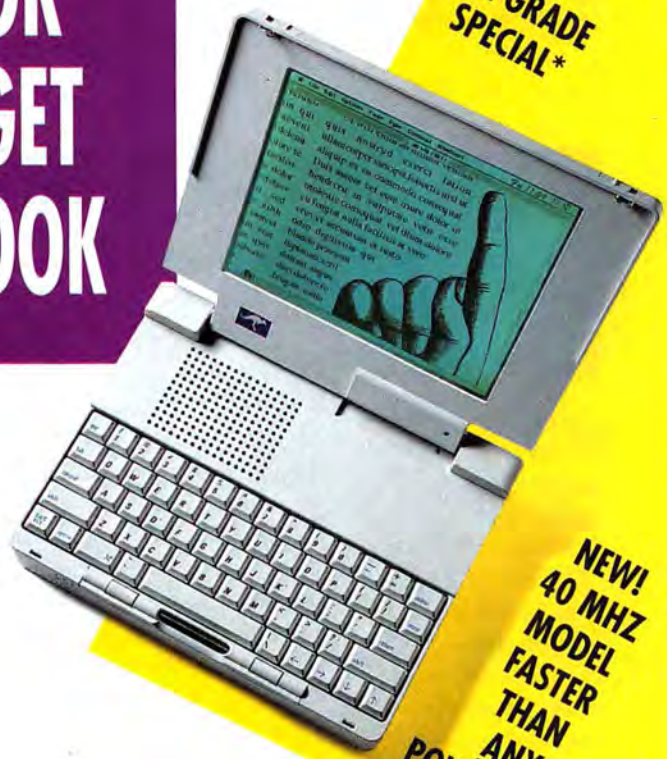
Adding an **expansion chassis** ($1,295 and up) gives you the flexibility to add multiple NuBus cards. Second Wave's expansion chassis gives you a "docking adapter" with multiple NuBus slots for the accelerator and monitor in your office, the I/O cards in your lab, and so on, and you can still easily unplug your SE/30 and take it on the road.

**Bob Brant is an Oregon-based Mac consultant and the author of *Upgrade Your Macintosh and Save a Bundle.***

**Table 1: Recommended Upgrades for the Mac SE/30**

| Upgrade | Pros | Cons | Cost |
|---|---|---|---|
| 4 MB of RAM (and more) | Ability to use System 7. Virtual memory. RAM disk. | Need MODE32 for access to more than 8 MB. | $120 and up |
| 105-MB hard drive | More speed. Storage. | Cost. | $360 and up |
| 33-MHz 68030 accelerator | Speed. | Cost. | $650 and up |
| Portrait display system | Reduced eyestrain. | Cost. | $900 and up |
| Expansion chassis | More slots and options. | Cost. | $1,295 and up |
| Total price of minimal upgrades | | | $3,325 |
| Used PowerBook 140 or Mac IIcx | | | $1,500 |
| New PowerBook 170 or Mac IIci | | | $3,000 |

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# TIP SHEET



**Nobody ever said you had to live in Cupertino to be a Macintosh expert. Know-it-alls are everywhere, from Manhattan to Malibu — even in Waldport, Oregon, where we found our own Mac guru, Philip Russell. Each month Phil shares his own tips plus the best of the 70-odd Macintosh-user-group (MUG) magazines he reads each month. But Phil can't do it alone. To those whose undocumented Mac tip *MacUser* prints, we pay $25, and the Reader Tip of the Month earns $100.**



**Send your tip, together with your name, address, and phone number, to Tip Sheet, c/o *MacUser*, 950 Tower Lane, 18th Floor, Foster City, CA 94404. You can also contribute tips electronically via ZiffNet/Mac, the on-line service for *MacUser*. Send**



**them to Gregory Wasson at 72511,36. Be sure to include your full name and mailing address along with the text of the tip.**

**By Philip Russell**

**Reader tips compiled by Gregory Wasson**

■ If lots of Help files are stealing valuable space on your hard disk (HyperCard Help, for instance, takes up more than 770K), make a set of floppies just for the Help files for all your applications. Then when you need help, the program will ask where its Help file is. Slap in the appropriate floppy, and get help.

■ Do you have a set of recovery disks ready in case of disaster? Each disk should include the current System and Finder files (but not much else in the System Folder) and one or more of the following: Disk First Aid, from Apple; HD SC Setup; your backup program; and any other good recovery programs you have, such as Norton Utilities or MacTools. You may need several recovery disks to accommodate all these tools.

■ Never connect or disconnect ADB devices such as keyboards, mice, or SCSI devices until the power to the Mac and all its peripherals is turned off.

■ You have color? Pretty, isn't it? You can speed things up considerably by turning the color off when you're doing work that doesn't require it. Using Fkeys is a quick way to toggle color on and off: Try the public-domain programs PixelFlipper and Switch-A-Roo, which are available from user groups and on-line services.

■ If you take your Mac to weird places, get an $8 outlet tester from Radio Shack and check the outlet before plugging your Mac in. This lets you avoid potential short circuits and power surges, which can damage your Mac.

■ What if you lose the use of a key in the middle of a job? A temporary fix is to have QuicKeys assign an alias key that will access the missing letter. Another fix is to use a pseudokey. For instance, if the G key stops working, use the backslash (\) whenever a *g* is needed. Then use the Replace feature to change all occurrences of a backslash to *g*.

Aha, you say. How do I get the *g* into the Replace dialog box? Here's how: Open Key Caps and click on the *g* on the Key Caps keyboard. Highlight and copy the *g* from the text box above the keyboard. Then open the Replace dialog box and paste the *g* into the Replace With box.

And stop drinking Coke and eating crackers around your keyboard.

■ Do you ever wish you could hide a column of figures in Excel? Here's how to do it: Select the column, and give it 0 width in the Format dialog box. To get your invisible column back, select the column before the 0-width column through the column after it. Specify an appropriate column width, and the invisible column will reappear. Finally, adjust the widths of the columns individually to suit your taste. (Thanks to MIAMUG of Michigan.)

■ Don't let your pets near your Mac. Cat and dog hair can stop a floppy-disk drive dead in its tracks. (Goldfish are OK as long as they don't splash your keyboard.)

■ Is your mouse just crawling? Open the Mouse control panel, and select a faster mouse-tracking speed. You can adjust your double-click speed here too.

■ You can move an inactive window by holding down the Command key and dragging that area of the title bar that would have stripes if it were active. The window will move while remaining inactive.

■ There are a few freeware and shareware Fkeys that let you select any part of the screen you like and then automatically copy the selection to the Clipboard. A couple of programs I've seen are called CopyScreen and ScreenToClip, but your user group or on-line service might have others. I couldn't live without my copy of CopyScreen! (Thanks to the Corvallis, Oregon, MUG.)

■ What is a soft return? When you want two words to stay together on the same line, hold down the Option key while typing the space between them. That's a soft return. It will keep the two words together — as you might want to do with *San Jose* or *à la carte*.

## Reader Tip of the Month: Word 5.0

Searching through a document to change straight, "dumb" quotation marks into curly, "smart" ones can be a nuisance, but there's an easy way to do it with Microsoft Word 5.0. First make sure that you have Smart Quotes turned on in the Preferences box, accessible from the Tools menu. Open the document containing the dumb quotes, and open the Replace dialog box (Command-H). Type Shift-apostrophe (the dumb double-quote) in the Find What box, and type another straight double quote in the Replace With box. Click on Replace All, and Word automatically replaces the straight quotes with curly ones. The same technique applies when you're dealing with single quotation marks and apostrophes.

This gimmick also works in reverse, in case you want to convert curly quotes into straight quotes for some reason. Follow the instructions above, except turn Smart Quotes off before you start.

Brad Ferguson
Walkersville, MD

## Reader Tips

### PowerBooks

PowerBooks can be a hassle when you have to deal with airport security. When you pass through the metal detector, you must hand over the computer to security personnel. After you've gotten through, you have to turn the thing on to demonstrate that it is actually a computer.

To speed up this process, before you get to the airport bring up the Battery DA, click on the Sleep button, and close the computer. When you get to the security checkpoint, open the computer and press any key, being careful not to move the trackball, and the screen will fire up. Then all you have to do to put it to sleep again is hold down the Shift key and click once. This technique spares you from having to boot the computer cold and then shut down.

Mike Cassidy
Honolulu, HI

### System 7 Apple Menu

Putting aliases of documents and folders into the Apple menu is nothing new. However, I've found that putting an alias of the Apple Menu Items folder into the Apple Menu Items folder itself makes it much easier to add and remove files from the Apple menu. That way you don't have to double-click on your hard-drive icon; double-click on the System Folder; and, last, double-click on the Apple Menu Items folder. You can place the alias on the desktop, but tucking it away in the Apple Menu Items folder avoids cluttering up your work space.

Sue Ann Sanders
Oak Creek, WI

### Word 5.0

If you have to open text files in Word, you've probably grown tired of the text dialog box that pops up asking you whether you want to treat the text as Text Only or Text with Layout. If you always choose Text Only, do away with this annoying dialog box by removing the Text with Layout module from the Word Commands folder.

Kristin Anderson
St. Paul, MN

### Note Pad and Alarm Clock

Here's a tip for people who need to keep track of time for billing but don't have a nifty program to track the time spent on a job. All you need are two DAs supplied on every Mac: Note Pad and Alarm Clock. Before starting a new job, open Note Pad and type in the name of the job or the name of the file to identify it. Then open Alarm Clock and copy the current time to Note Pad. (To copy, just click on Alarm Clock to select it and type Command-C. Select Note Pad, position the cursor where you want to put the time, and type Command-V.) When you've completed your session, open Note Pad and Alarm Clock again and paste the current time once more into Note Pad. When finished with the job, you simply add up the total time spent and send out your bill.

Patricia A. Ten Eyck
Phoenix, AZ

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### AppleShare

Here in our computer lab, the student stations are set to log on to the file server automatically with guest privileges at startup. Students using the Chooser to log on with their own passwords were changing the default setup by unchecking the box next to the names of the various volumes. So we locked the AppleShare Prep file, which prevents any permanent change to the default guest status but still lets students log on as registered users.

Eugene Cohen
Chicago, IL

### Printing

When you prepare a document and then take it somewhere else to print it, you may often find that your margins or page breaks have shifted. This is especially true if you print rough drafts on a dot-matrix printer and final drafts on a laser printer. Although there is no real way to avoid these changes, you can prepare for them. Here's how:

**1.** Find out exactly which printer driver you will be using at the other location, and make sure you have a copy of it in your System Folder.

**2.** Go to the Chooser, and select the printer you will use for your rough drafts.

**3.** Prepare your document, and print rough drafts. Then save your document with a suffix that indicates which printer you used (for example, Document.ImageWriter).

**4.** Go to the Chooser, and select the printer you will use for final drafts. (It doesn't matter if the printer is not hooked up to your computer.)

**5.** Fix any problems that may have cropped up when you switched printer drivers, and save the document with a new suffix (Document.Laser, for example).

**6.** Take the document to the printer you will use for the final draft, check that the correct driver is selected in the Chooser, load your document, and print it without worry.

John R. Clark
Greensboro, NC

### System 7 Scrapbook

Ever wished that System 7 included a calendar DA accessible on the Apple menu? Here's a relatively simple way of creating a desktop calendar using HyperCard's Appointments stack, a graphics program, and the Scrapbook.

Open the Appointments stack, and take a screen shot (Command-Shift-3) of the window with the current month displayed. Advance the stack calendar to the next month, and take another screen shot.

Return to the Finder, and open the screen shots in your graphics program, erasing any parts of the shots you don't need. Combine the two months in one document by using the Copy and Paste commands. Use the program's marquee tool to select the two side-by-side months. Copy them to the Clipboard.

Open the Scrapbook, and paste. You can then repeat the procedure for as many months as you want.

Then whenever you need to consult a calendar, just open the Scrapbook.

Alan Sato
Richmond, CA


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# HELP FOLDER




**Questions, anyone? Here's where to get answers from the experts. Bob LeVitus is the author of the best-selling *Dr. Macintosh*, second edition. Andy Ihnatko is a longtime activist with BCS•Mac. They're both ready to answer your questions about everything Macintosh.**



**Write to Help Folder, c/o *MacUser*, 950 Tower Lane, 18th Floor, Foster City, CA 94404. Don't want to wait for an answer? Post your question on ZiffNet/Mac, *MacUser*'s on-line service, and get a reply from Bob (76004,2076), Andy (72511,204), or one of the other *MacUser* experts. See the masthead in this issue for instructions on how to sign up.**

**By Bob LeVitus and Andy Ihnatko**

### Bermuda Rectangle Redux

**Q.** The smooth-dragging control in FreeHand 3.x can have an effect you didn't mention in the September '92 Help Folder (see "The Bermuda Rectangle," page 279). After I bought FreeHand 3.0, I noticed some problems when placing exported EPS files in PageMaker. Aldus tech-support suggested I try changing the buffer indicator to all white and then reexporting the file. This worked. I don't know if this problem has been remedied in 3.1, but I've gotten into the habit of clearing that buffer before I export.

Jim Voorhies
via CompuServe

***Bob:*** If you're a FreeHand user, make a note of this and save yourself a call to Aldus.

### Faster Photo Display

**Q.** I use FileMaker Pro to keep track of 1-megabyte color photos but find on-screen display slow when I'm changing between records. I have a Mac IIci with 8 megabytes of RAM, a 16-inch AppleColor monitor, and a Macintosh Display Card 8•24. What's the best and most cost-effective software/hardware solution to this problem?

Jude Lam
Hong Kong

***Bob:*** There are a couple of things you should try. First, by the time you read this, FileMaker Pro 2.0 will be available, and it's supposed to be faster than version 1.0. It may be all you need, and a software upgrade is definitely the least expensive solution.

If that isn't good enough, consider an accelerated-video card. I use a Thunder/24, from SuperMac, and it's the fastest video accelerator I've ever tried (8-bit cards are also available). Other manufacturers include RasterOps, Radius, and E-Machines.

Because an accelerated-video card provides different amounts of acceleration — depending on the program you're using and the task you're performing — test your database with the accelerated card before you buy it. It might not speed up FileMaker Pro enough to warrant the expense. On the other

## ✻ . . . But Were Afraid to Ask

In the beginning, there was absolutely nothing at all — not a sausage. The whole of Creation was a formless, dark void, and so the Lord said, "Let there be light." Then there was still nothing. But at least you could see it.

So there it was: no traffic lights, no fax machines, no 11-part Federal Express forms. The Universe was a simpler place, and weren't we all the happier for it? I certainly was. Now, the only beacon of simplicity in the frenzied minimall known as the Universe is this column. So if you too yearn for those halcyon days of utter nonexistence, shout out your pride by sending us a simple question that no one else seems to be asking. In case you don't want to be seen doubting the Lord's vast plan, we'll say it was sent in by a fallen angel chosen at random.

**Q.** You guys often talk about problems with the Desktop file, how to rebuild the desktop, and so on, but I'm left with one nagging question: What (and *where*) exactly *is* the Desktop file?

Urakabarameel
You Know Where

***Andy:*** The Desktop file is the invisible file on each Mac volume that keeps track of certain trivia regarding the files on a volume. It's not a directory; rather, when the Finder mounts a volume, it looks in the Desktop file to see which of its folders should be open in the Finder. When you double-click on an Excel document, some of the information on which program created it (and should be used to open it) is found in the Desktop file. When you do a Get Info on a file and see the comments in the box, you're looking at information called up from the Desktop file. Ditto for the nongeneric icons that adorn most Mac files. You can make the Finder rebuild a volume's desktop from scratch by holding down the Option and Command keys while the volume mounts.

The reason you read so much about rebuilding the desktop is because it's a common solution to many problems, such as losing your icons or getting an "Application can't be found" message. Rebuilding the desktop is also a handy thing to try when the Finder is acting way slow. There's just one drawback — you'll lose any comments you've typed in to the Get Info box. Luckily, however, one of our vigilant readers has a solution to that problem. According to John Thoo, as long as you have the freeware extension CommentKeeper 1.0 in your System Folder, your Get Info comments will remain even when you rebuild the desktop. You can get CommentKeeper from on-line services (such as ZiffNet/Mac) and user groups.

Rebuilding the Desktop file when your Mac's wonking up is like popping the hood of your car when it breaks down and jiggling all the hoses and wires. It doesn't hurt anything and may actually solve the problem, and if you have spectators, it gives you the illusion that you are diligently and intelligently solving the problem while buying enough time to think the thing through.




**Figure 1: Kodak's new Photo CD system lets you store photos on a CD-ROM and then view them with a special player that hooks up to your TV.**

hand, it may make FileMaker Pro fly through your records. Just make sure to try before you buy, and you'll be OK.

***Andy:*** You didn't mention what you need digitized photos for, but I'll leap on this opportunity to plug Kodak's keen new Photo CD system (see Figure 1), a neato solution if you're using FileMaker to keep track of traditional photos. You can drop off negatives or even unprocessed film at your local film-developing outfit, and a week later, you get back a CD-ROM filled with your images, which can be reviewed with a special player that connects to your TV set or with a Mac CD-ROM drive. It's a cool system; each image is stored in three resolutions: a rough resolution for display on TV sets, a medium one for computer screens, and a fine resolution for photographic-quality printouts. The whole setup costs less than $500.

### Strange Message

**Q.** After completing my work with MacInTax, I deleted all of its files to save disk space. Now, when I start up my Mac, I get a "startup file MacInTax 91 could not be opened (the file is missing)" message. I'm using System 6 on a Classic with 4 megabytes of RAM.

Galen Ewing
Las Vegas, NM

***Bob:*** I'm willing to bet that you used the Finder's Set Startup command to make your Mac automatically launch MacInTax at startup and then removed MacInTax from your hard disk but never told your Mac to stop trying to launch it. So now every time you start up, you're confronted with that nasty message. To set things straight, simply choose Set Startup from the Finder's Special menu and click on the Finder Only button.

***Andy:*** Similar problems can occur under System 7. If you're experiencing wacky startup problems, it's usually a good idea to check your Startup Items folder (in the System Folder) as a matter of course.

### Close Your Windows?

**Q.** I'm a high-school student and have a Mac Plus running System 6.0.7. My father, who uses a Mac at his office, went to a "how to" seminar given by his company's resident Macintosh expert. She insists that windows that are left open on the desktop cause crashes during startup. I've never heard of such a thing, nor have I ever experienced a crash on startup with one or more windows open. Could you please tell me if this is true, because, personally, I find it annoying to have to open my hard-drive window after every startup.

Michael Adams
Peterborough, Ontario
Canada

***Bob:*** That has to be one of the most unheard of things I've ever heard of! To put it bluntly, your dad's Macintosh expert's advice is hogwash. It's perfectly safe to leave windows open at startup.

***Andy:*** Well, let's look at this from an anthropological angle and assume that lead-lined aqueducts had nothing to do with her thought processes. If I were forced to justify her assertion, I *suppose* I could argue that whenever you change the state of your desktop, the Finder has to make changes to the Desktop file and if something goes wrong while that invisible file is writing, your system may crash when you restart. But this is the same sort of grasping-at-straws legal maneuvering the financial wizards of the '80s are now using to try to avoid spending the next 5 to 12 years raking the sand traps of government-owned golf courses. The bottom line is this: Tell your dad to stop payment on that check, pronto.

### Silence of the Chimes

**Q.** The startup chime of my IIsi is pleasant, but is there a way to silence it if I get the urge to work before my family is awake? I thought about plugging something in to the external speaker jack, but that seems cumbersome. Please tell me there's a keyboard command or extension for "hush on startup."

Don Kahle
Guilford, CT

***Bob:*** Don, I'm sorry to be the bearer of bad news, but the only way I know of to silence that infernal sound is to plug something — a cable with nothing attached, or just a plug — in to the speaker jack. This one has stumped me for a long time, but as far as I can tell, there's no other way (short of disconnecting the speaker) to shut the darn thing up. I'll offer up a spiffy "I Beat the System" T-shirt to anyone who can show me a better way.

By the way, this problem is even more severe if you have a PowerBook. Every time you start the thing up, you wake everyone within spitting distance. Because I fly a lot, I finally went to Radio Shack and bought myself a little plug with nothing attached. It's not particularly pretty, but it works.

### The Time Piece

**Q.** My LC gains about a minute and a half a month. The first trip to the service department resulted in a new battery, and the second meant a new logic board. Neither did the trick and I'm now out of warranty, which isn't a life crisis, seeing that a bad clock won't cause foul-ups elsewhere. Or will it? A computer that can't keep time as well as my $10 K mart watch does make me wonder if this is a symptom of problems to come.

John Oswald
Wichita, KS

***Andy:*** According to all the hardware folks I called, Apple views the sort of inaccuracy that is totally unacceptable for a timepiece as okeydokey for a computer. Evidently there's enough slack in the hardware and software driving the computer's clock that variations of a minute or so per month are commonplace. According to the party line, your Macintosh isn't "broken" unless it loses or gains more than six minutes a month, so your chances of getting Apple to fix your LC for free lie somewhere within the borough of Nowheresville.

Here are two workarounds: First, you can have your son or daughter keep a constant vigil beside your LC, mumbling "One Mississippi . . . two Mississippi . . . three Mississippi" and making minor adjustments as necessary; second, seek salvation in the shareware community. Jean-Pierre Gachen's AutoClock

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MACWORLD MW EDITORS' CHOICE

The *Macworld* Editors' Choice for high-capacity back up, APS's Compression DAT stores up to 5GB per 90-meter tape cartridge. Need fast, high-capacity back-up? This $1699 DAT offers one of the best archiving solutions on the market. Internal models for Quadra 900 and 950 are just $1599. Only need to squeeze 1.2 to 2GB onto a cartridge? Take a look at APS's non-compression DAT, now just $1399.

### High-quality, high-density storage

This Archive Python-based SCSI digital audio tape drive which combines high capacity with exceptional performance is available in external configurations as well as internal options for Mac Quadra 900 and 950 models.

### Quick access, dependable performance

Consistently rated tops by the leading computer magazines, APS's Compression DAT backs up at a rate as high as 14MB per minute, with non-compression units clocking in at up to 10MB per minute.

APS DATs carry a two-year manufacturer's warranty and APS's drive-for-drive replacement warranty. These DATs also come bundled with Retrospect, the standard in tape back up software from Dantz Development (we include Sytos Plus with PC versions).

Easy-to-follow installation instructions for internal models, all necessary cables and one 60m tape cartridge are also included with each DAT.

You also get the peace-of-mind of knowing APS's knowledgeable technical support staff is there to answer your questions, ready and available, toll-free, six days a week.

### Load up on media

If your emergency back up scheme requires that multiple tapes be stored off-site, make sure you start out with plenty of cartridges. Maxell DAT tapes are available in 60m and 90m 10-packs for $110 and $130, respectively.

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• **Prices and specifications subject to change without notice.**

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| MB | INTL | EXTL |
|---|---|---|
| 120 | 399 | 479 |
| 240 | 629 | 699 |
| 425 | 929 | 999 |
| 525* | 1149 | 1219 |
| 1225* | 1899 | 1969 |
| **Go•Drives** | | |
| 80 | $349 | $499† |
| 120 | 469 | 599† |
| **ELS Drives** | | |
| 42 | $199 | $279 |
| 85 | 299 | 369 |
| 127 | 349 | 419 |
| 170 | 399 | 469 |

## Fujitsu

| MB | INTL | EXTL |
|---|---|---|
| 520 | $1049 | $1149 |
| 1.2G | 1599 | 1799 |
| 2.0G | 2595 | 2695 |

*Includes Fujitsu's 5-Year Warranty*

## Toshiba

| | | |
|---|---|---|
| 830 | $1299 | $1379 |

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| 630 | $1599 | $1699 |
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| 1.6G | 2549 | 2649 |

## Maxtor

| | | |
|---|---|---|
| 120 | $339 | $419 |
| 213 | 499 | 569 |
| 340 | 699 | 769 |
| 535 | 1099 | 1199 |
| 760 | 1299 | 1399 |
| 1.2G | 1699 | 1799 |
| 1.7G | 2299 | 2399 |

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# APS Technologies

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MACWORLD MW EDITORS' CHOICE

*Macworld* has selected this TEAC I55 tape unit as its Editors' Choice in the personal back up category. With a back-up rate of 4.5MB per minute, this compact tape unit backs up I45MB per 60-meter cassette. Each unit includes Retrospect by Dantz , one 60m tape and a premium SCSI cable. With TEAC's one-year warranty and APS's legendary service and support, what more could you ask?

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## SyQuest

| Model | EXTL |
|---|---|
| SQ555 | $399 |
| SQ5110 | 499 |
| Dual 44 | 799 |
| Dual 88 | 959 |

***SyQuest Cartridges***

| | |
|---|---|
| *44 MB* | *$65* |
| *88 MB* | *105* |

## DAT

| Model | INTL* | EXTL |
|---|---|---|
| APSDAT | $1599 | $1699 |

*2.6–5 GB Compression DAT*

| | | |
|---|---|---|
| APSDAT | 1299 | 1399 |

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***Digital Audio Tapes***

| | |
|---|---|
| *Maxell 60-Meter* | *$12* |
| *Maxell 90-Meter* | *16* |

## Epson

| Model | INTL | EXTL |
|---|---|---|
| MO | $1099 | $1199 |

*Magneto Optical Drive*

## SOLA

UPS

| | |
|---|---|
| 450 watt | $220 |
| 600 watt | 330 |

## TEAC

| | |
|---|---|
| I55MB Tape Back-up | $499 |
| 600MB Tape Back-up | 799 |

*All tapes drives include Retrospect by Dantz Development*

## Toshiba

| | |
|---|---|
| CD-ROM 3301B | $569 |

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APS TECHNOLOGIES

CIRCLE 146 ON READER SERVICE CARD.

(see Figure 2) is a neat application/extension combo for keeping your clock accurate; it combines the features of several clock utilities available in the shareware community. First, by placing a modem call to a time server in Washington, D.C., it can set your clock with the accuracy of a clock powered by nuclear energy and taxpayers' dollars. Second, the extension can *keep* your clock accurate, either by calling the time server and resetting the clock automatically according to a schedule you define, or cooler yet, the software can figure out how much time your clock loses every day on average, and make the necessary corrections without any assistance whatsoever.

From the You-Didn't-Ask-But-I'll-Tell-You-Anyway Department: Let me tell you about two other time-related bits of shareware. D. Grant Leeper's Daylight Savings Time does pretty much what you think it does; you configure it once, and you will forevermore spring forward and fall back automatically. And you network administrators will love Time Server, by John Raymonds. It's a system extension and Chooser device that makes each Mac on your network synchronize its clock with a designated network "time server" at each startup. Absolutely indispensable in networked database applications, in which integrity of time/date stamping requires that all Macs read the same time at the same time, eh?

All three programs are available from the usual sources, including ZiffNet/Mac (and other on-line services) and your local user groups.

### 7 and UNIX: Together at Last

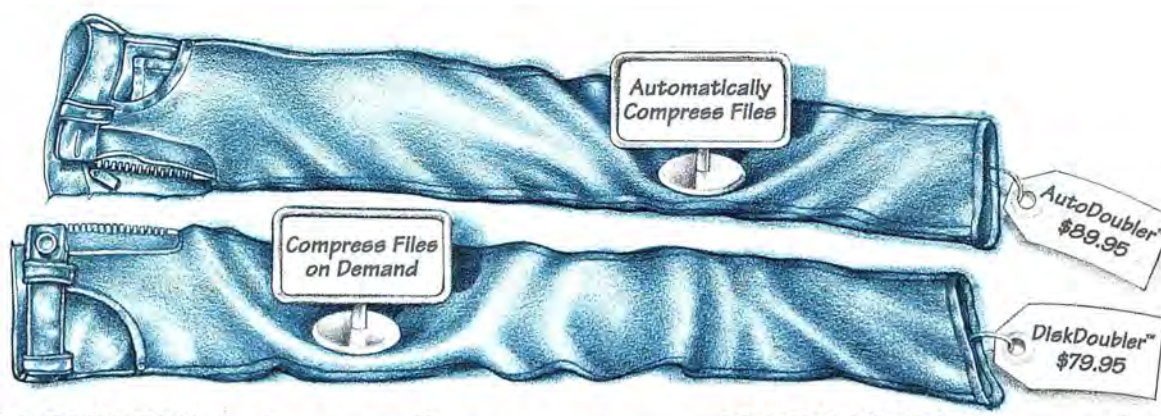
**Q.** I'm considering buying a new Macintosh that can run the UNIX operating system. Until recently, the IIsi has been the entry-level machine for UNIX, but now that the LC II has an '030 processor, is it the entry-level machine?

Is it possible to switch between UNIX and System 7, and can both operating systems exist on the same hard disk?

Douglas Messier
Fredericksburg, VA

***Andy:*** Ah, UNIX! For those of you who've never heard of it, UNIX is a savagely popular operating system that runs on just about any platform, from room-filling behemoths to desktop machines such as the Mac and the PC (for more on UNIX, see "Battling for the UNIX Crown," November '92, page 221). Like MS-DOS, UNIX is chiefly command-line-driven, but unlike DOS users, people who use UNIX eventually cease to believe it's a kludged-up operating system from Hades. As you might guess, I hold UNIX in much the same esteem that Dracula reserves for nice, warm, soft necks.

The most famous version of UNIX for the Macintosh is Apple's own A/UX (available from your Apple dealer; $709). It's so big that you can buy it only on a CD-ROM or — talk about excessive, earth-hostile product packaging — preinstalled on the Mac of




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| | | Internal | External |
|---|---|---|---|
| 330 MB | 3.5" | $998 | $1098 |
| 425 MB | 3.5" | $1098 | $1148 |
| 520 MB | 3.5" | $1048 | $1148 |
| 680 MB | 5.25" | $1388 | $1488 |
| 1.2 Gig | 5.25" | $1548 | $1648 |
| 2.06 Gig | 5.25" | $2578 | $2678 |

## Toshiba Drives

| | | Internal | External |
|---|---|---|---|
| 1200 MB | 3.5" | $1698 | $1748 |
| 877 MB | 3.5" | $1298 | $1348 |

## Conner Drives

| | | Internal | External |
|---|---|---|---|
| C 42 MB | 3.5" | $208 | $268 |
| C 85 MB | 3.5" | $258 | $328 |
| C 120 MB | 3.5" | $328 | $398 |
| C 170 MB | 3.5" | $398 | $448 |
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CIRCLE 74 ON READER SERVICE CARD.

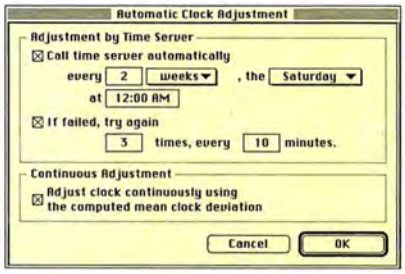



**Figure 2: AutoClock automatically places a call to a time server in Washington, D.C., and then it transparently adjusts your Mac's clock.**

your choice. It's a UNIX that has been customized for the Macintosh with a lot of graphical doodads that make it considerably less painful. It comes fully stocked with every UNIX-oid tool you could possibly need and even includes several A/UX versions of the X Window graphical user interface.

A/UX has a strong following, but it's not without drawbacks. First, it requires a moderately powerful system: a 68030 Mac (or a 68020 Mac with a PMMU chip installed) with at least 8 megabytes of memory and an 80-megabyte hard drive. Compatibility information vis-à-vis A/UX 3.0 and the LC II was not available at this writing, but there's no major stumbling block preventing an LC II from running A/UX.

The more serious drawback is that under A/UX, your computer magically becomes a UNIX machine capable of running software written for Macs and not the other way around. A/UX volumes are formatted completely differently from Mac volumes, so Mac and UNIX applications and files can't share the same hard disk without partitioning. Worst of all, Macintosh applications can be run only as special "UNIX processes" through A/UX, so you're pretty much rolling the dice every time you try to run non-UNIX software.

The other option for getting UNIX onto your Mac is Tenon Intersystems' MachTen (805-963-6983; $595). Unlike A/UX, MachTen is a standard Mac application that runs alongside the Finder just like any other program. It's a snap to install, requires no specially formatted disk partitions, has no screwy Mac/UNIX intermingling problems, and runs just fine under System 7. Best of all, it runs on any Mac with 4 megabytes of RAM and 40 megabytes of storage space, including a Mac Plus — which means MachTen will run on Classics and PowerBooks without difficulty. *Most* niftoid. And unlike certain UNIX clones that are almost, but not quite, completely unlike UNIX, MachTen is genuine BSD 4.3 UNIX, with all the programming and internetworking niceties that Berkeley UNIX entails.

MachTen's only real drawback is its price. It's a bit less expensive than A/UX, and it's well stocked with the usual UNIX utilities, but it lacks many of A/UX's goodies.

Finally, I should report a good, hard rumor that certain individuals are working on a Macintosh version of the Mach UNIX kernel (the standard on which MachTen is based) and that it'll be available Real Soon Now on a CD-ROM for less than $100. No further details, but hope springs eternal.

***Bob:*** Having once worked in a place where UNIX was the desktop environment of choice, all I have to say is, "My condolences to you, Douglas Messier."

As for you, Andy, it figures you'd want to bite UNIX on the neck.




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CIRCLE 123 ON READER SERVICE CARD.

# This Month on ZiffNet/Mac

## ZMAC UTILITY

This month's utility, the Custom Icon Pack, comprises Mac CPU icons for dressing up your desktop, running the gamut from the original Macintosh 128K to the latest Performas and the PowerBook Duo line of CPUs. You can use any of these icons as a replacement for your hard-drive icon, or if you're handy with ResEdit, you can install them in your system software. Each icon is rendered in 3-D and in color. The 128K Mac is a soft beige, later models shine in platinum, and the PowerBooks stand out in granite gray. The 3-D effect of the icons gives your desktop a unique look.

The Custom Icon Pack comes in two formats. Each Mac icon is provided as a TeachText file, and the whole family of icons is provided as a ResEdit file.

The Custom Icon Pack was created by ZiffNet/Mac's new associate editor, Mark Simmons. It is available exclusively on ZiffNet/Mac and is free for one month to those who have paid the $2.50 monthly membership fee. Until December 23, 1992, you can get the file by typing GO ZMC:POWERTOOLS. After that, you'll find the file MACICN.CPT in the Download & Support Forum (GO ZMC:DOWNTECH).

**By Ben Templin**

## Monitor Alternatives

When is 13 inches not big enough? When you have a cache of 16-inch monitors that are tried and tested by MacUser Labs. The focus of this month's discussion in the MacUser Forum is on monitors — which ones are right for you and how much should you pay for them. From December 7 to 11, MacUser Labs director Jeff Pittelkau hosts a discussion of the January issue's lab report on 16-inch monitors. To join in, type GO MACUSER, and read Message Section 9.

## Free (and Nearly Free) Files

Sysop Gregory Wasson presents a sampling of files recently uploaded to ZiffNet/Mac's Download & Support Forum (just type GO ZMC:DOWNTECH). The filename and library are in parentheses.

**AutoClock** (AUTOCL.CPT, Library 1) is an application and system extension that helps your Mac's clock keep accurate time. You set the clock by calling a time standard in Washington, D.C. AutoClock also shows the date and time anywhere in the world. The extension lets you configure AutoClock to automatically reset the clock at certain intervals. Requires a modem and System 6.0.5 or later. System 7-compatible. Freeware. 126K.

**Daylight Savings Time** (DSTIME.CPT, Library 3) is a control panel that adjusts the Mac's internal clock as daylight-saving time starts or ends. If you can't remember "spring forward and fall back," this extension makes the proper adjustments for you. System 7-compatible. Freeware. 4K.

**Folder Icon Maker** (FOLMAK.CPT, Library 1) creates folders with custom icons under System 7. To use it, you simply drag an application or document onto the FIM icon. A new folder bearing that file's icon is created. Requires System 7. Freeware. 22K.

**Message DA** (MESSAG.CPT, Library 2) lets you enter a message, which is then displayed in a black band running across your screen — like a stock-exchange display or a flashing movie marquee. Leave messages for coworkers when you've stepped away from your desk. Easy to use. Freeware. 4K.

**Notify** (NOTIFY.CPT, Library 3) is a simple and inexpensive appointment-reminder system. It works as a control panel that makes use of the Notification Manager to post alerts at user-specified times. Requires System 6.0 or later. System 7-friendly. Shareware, $10. 80K.

**Spacestation Pheta** (SPHETA.SEA, Library 1) is an arcade game in which your goal is to move your alter ego through a maze of platforms and ladders to obtain the key to the next level. You have limited oxygen — canisters strewn about let you replenish your supply — so it's a race against time. Simple graphics but an entertaining diversion. System 7-compatible. Shareware, $9.95. 164K.

**TattleTale DA** (TATTLE.SEA, Library 2) provides complete information about your computer, such as a list of extensions or hardware configurations. The information can be viewed on-screen, printed, written to a text file, or output in database-readable format. This DA's reports come in handy for reporting problems to software and hardware manufacturers. Freeware. 142K.

**TearOFFs** (TOFFS.CPT, Library 3) allows menus, even hierarchical ones, in any application to be torn off. Great for large monitors. Save yourself those long trips to the menu bar. Requires System 6.0 or later. System 7-compatible. Shareware, $25. 47K.

### Zmac Tip of the Month: Toggling into Terminal Mode

CompuServe Information Manager (CIM) is a graphical interface to ZiffNet/Mac, but some users occasionally want to go back to a terminal emulator in order to easily capture a lot of text messages from a forum. You don't have to switch programs to get into ASCII mode with CIM.

The first step is to check the preference that keeps the Favorite Places window on the desktop at all times. While off-line, choose ADD in the Favorite Places window and enter Terminal Toggle in the space for the location name. In the space for the GO word, enter ASCII.

You can now click on this to toggle into and out of terminal mode. And you can launch your session by double-clicking on the ASCII toggle to log on in Terminal mode.



# When a bug showed up in a new program, the first to know was a guy in Montana. And everyone on CompuServe.

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|---|---|---|---|---|
| Memory | 2Mb/16Mb | 4Mb/16Mb | 3Mb/4Mb | 2MB/6MB |
| Pages/Minute | 4 | 4 | 4 | 4 |
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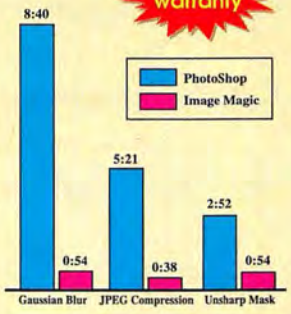
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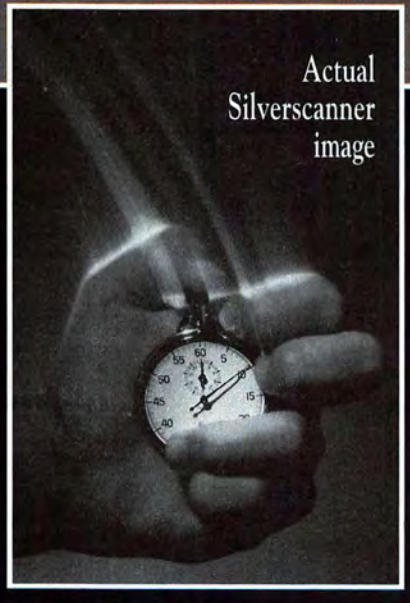
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**1. For how many micro computers do you buy products? (check one)**

☐ 01) 1-4 ☐ 02) 5-49 ☐ 03) 50+

**2. Your primary job function is: (check one)**

☐ 01) Administrative/ General Management
☐ 02) MIS/DP, Communications Systems, Programming
☐ 03) Engineering/R&D
☐ 04) Finance/Accounting
☐ 05) Marketing/Sales
☐ 06) Computer Dealer/VAR

**3. For which of the following products are you involved in selecting brands/models to be bought by your company or organization? (check all that apply)**

**4. Which of the following products have you bought in the last 6 months? (check all that apply)**

| SOFTWARE | Q3 | Q4 |
|---|---|---|
| Accounting | ☐ 01 | ☐ 01 |
| Spreadsheets | ☐ 02 | ☐ 02 |
| Project Managers | ☐ 03 | ☐ 03 |
| Word Processors | ☐ 04 | ☐ 04 |
| Database Managers | ☐ 05 | ☐ 05 |
| Graphics | ☐ 06 | ☐ 06 |
| Integrated Software | ☐ 07 | ☐ 07 |
| Communications | ☐ 08 | ☐ 08 |
| Utilities | ☐ 09 | ☐ 09 |

| HARDWARE | Q3 | Q4 |
|---|---|---|
| Modems | ☐ 10 | ☐ 10 |
| Scanners | ☐ 11 | ☐ 11 |
| Microcomputer | ☐ 12 | ☐ 12 |
| Printers/Plotters | ☐ 13 | ☐ 13 |
| Monitors/Displays | ☐ 14 | ☐ 14 |
| Storage | ☐ 15 | ☐ 15 |
| Add-in Boards | ☐ 16 | ☐ 16 |
| Networking | ☐ 17 | ☐ 17 |

**5. If so, what function do you serve in the buying process? (check all that apply)**

☐ 01) Initiation/ Determine Need
☐ 02) Selection of Brand and Model
☐ 03) Selection of Source
☐ 04) Authorization
☐ 05) Other

**6. Over the next 12 months, how much will your organization spend on computer products or services? (check one)**

☐ 01) over $5 million
☐ 02) $1 - 5 million
☐ 03) $500,000 - $999,999
☐ 04) $100,000 - $499,999
☐ 05) $50,000 - $99,999
☐ 06) $10,000 - $49,999
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| **42mb** | ELS42 | 3.5" Low Profile 19ms | 40mb | $185 | $245 |
| **85mb** | ELS85 | 3.5" Low Profile 17ms | 82mb | $269 | $329 |
| **127mb** | ELS127 | 3.5" Low Profile 17ms | 124mb | $329 | $389 |
| **170mb** | ELS170 | 3.5" Low Profile 17ms | 160mb | $385 | $445 |
| **52mb** | LPS50 | 3.5" Low Profile 11ms | 49mb | $209 | $269 |
| **105mb** | LPS105 | 3.5" Low Profile 11ms | 100mb | $319 | $379 |
| **120mb** | LPS120 | 3.5" Low Profile 10ms | 116mb | $349 | $409 |
| **240mb** | LPS240 | 3.5" Low Profile 10ms | 234mb | $589 | $649 |
| **425mb** | PRO425 | 3.5" Half Height 9ms | 406mb | $899 | $959 |

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| CMO-LF3004 | Panasonic | 128mb | 3.5" Half Ht | 45ms | $1169 |
| CMO-3100E | Ricoh | 128mb | 3.5" Half Ht | 45ms | $1249 |
| CMO-3051E | Ricoh | 594/652mb | 5.25" Full Ht | 28ms | $2695 |
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All ClubMac Opticals include ONE cartridge and ONE Year Warranty.

NEW!

## MICROPOLIS

| Capacity | Model | Description | Access Time | Internal | External |
|---|---|---|---|---|---|
| **1.0GIG** | 2112 | 3.5" Half Ht./Fast SCSI-2 | 10ms | $1959 | $2019 |
| **2.0GIG** | 1924 | 5.25" Full Ht./Fast SCSI-2 | 11.5ms | $3129 | $3299 |

5 YEAR WARRANTY

## FUJITSU

| Unformatted Capacity | Model | Description | | Actual MAC Capacity | Internal | External |
|---|---|---|---|---|---|---|
| **425mb** | M2623SA | 3.5" Half Height | 9ms | 405mb | $969 | $1029 |
| **520mb** | M2624SA | 3.5" Half Height | 9ms | 496mb | $1035 | $1095 |
| **1.2GIG** | M2266 | 5.25" Full Height | 14.5ms | 1029mb | $1589 | $1689 |

Featuring ... the Elite Series

## Seagate

| Unformatted Capacity | Model | Description | | Actual MAC Capacity | Internal | External |
|---|---|---|---|---|---|---|
| **248mb** | ST3283 | 3.5" Low Profile | 12ms | 235mb | $635 | $695 |
| **1.2GIG** | ST11200N | 3.5" Half Height | 10.5ms | 1000mb | $1879 | $1939 |
| **645mb** | ST4767N | 5.25" Full Ht W-R II | 11.9ms | 634mb | $1529 | $1629 |
| **1.2GIG** | ST41200N | 5.25" Full Ht W-7 | 15ms | 989mb | $1585 | $1685 |
| **1.6GIG** | ST41651N | 5.25" Full Ht W-8 | 15ms | 1350mb | $1989 | $2089 |
| **2.1GIG** | ST42100N | 5.25" Full Ht W-9 | 12.9 | 1900mb | $2829 | $2929 |
| **1.6GIG** | ST41600N | 5.25" Full Ht **Elite-1** | 11.5ms | 1307mb | $2269 | $2369 |
| **2.4GIG** | ST42400N | 5.25" Full Ht **Elite-2** | 11ms | 2050mb | $3095 | $3195 |
| **3.4GIG** | ST43400N | 5.25" Full Ht **Elite-3** | 11ms | 2750mb | $4329 | $4429 |

Seagate Drives include a ONE Year Warranty.

5 YEAR WARRANTY

## HEWLETT PACKARD

| Unformatted Capacity | Model | Description | | Actual MAC Capacity | Internal | External |
|---|---|---|---|---|---|---|
| **234mb** | C2233 | 3.5" Half Height | 12.6ms | 223mb | $749 | $809 |
| **422mb** | C2235 | 3.5" Half Height | 12.6ms | 402mb | $1159 | $1219 |
| **1.2GIG** | C2247 | 3.5" Half Height | 12ms | 1000mb | $2229 | $2289 |
| **677mb** | 97556 | 5.25" Full Height | 16.5ms | 633mb | $1399 | $1499 |

HP Disk Drives feature SCSI-2 embedded controller* • MTBF of 150,000 hour

Call for Internal Prices

## ClubMac TAPE BACKUP Systems

| Capacity | Model | Description | Media | Access Time | External |
|---|---|---|---|---|---|
| **155mb** | Teac MT2ST/N50 | Analog | CT600N5-7 | MB/s | $489 |
| **600mb** | Teac MT2ST/F50 | Analog | CT600F | 7-10MB/s | $699 |
| **2.0GIG** | ARDAT | DAT, DDS | 4mm | 10-15 MB/s | $1249 |
| **2.0GIG** | WangDAT 1300XL | DAT, DDS | 4mm | 10-15 MB/s | $1329 |
| **3-5GIG** | WangDAT 3200 | DAT, DDS-DC | 4mm | 10-15 MB/s | $1549 |
| **2.0GIG** | HP 35470A | DAT, DDS | 4mm | 10-15 MB/s | $1389 |
| **3-5GIG** | HP 35480A | DAT, DDS-DC | 4mm | 10-15 MB/s | $1569 |
| **2.2GIG** | Exabyte EXB-8200 | Digital/Helical | 8mm | 10-15 MB/s | $1949 |
| **5.0GIG** | Exabyte EXB-8500 | Digital/Helical | 8mm | 10-15 MB/s | $2999 |

***Includes RetroSpect v.1.3c Backup Software, One Tape***
and ONE Year Warranty

NEW Lower Prices

# DAYSTAR DIGITAL

PARTICIPATING 30 DAY MONEY BACK GUARANTEE

**PowerCache**
(Classic, SE, LC, SE/30, II, IIx, IIcx, IIsi, IIci)

| | w/o FPU | w/ FPU |
|---|---|---|
| 16 MHz PowerCache | $399 * | $459 * |
| 33 MHz PowerCache | $539 * | $659 * |
| 40 MHz PowerCache | $749 * | $909 * |
| 50 MHz PowerCache | $1079 * | $1319 * |
| Equalizer LC | $169 | $239 |
| PowerCache Adapter | $40 | |

* Cache Adapter not included

**Cache Cards**

| | |
|---|---|
| FastCache IIsi | $279 |
| FastCache IIsi with 68882 | $349 |
| FastCache IIci | $215 |
| FastCache 040 (128K - Q700/900) | $259 |
| FastCache 040 (128K - Q700/900/950) | $399 |

**Expansion Boards for Mac LC & IIsi**

| | |
|---|---|
| DualPort IIsi | $165 |
| PowerMath LC | $115 |
| NEW! 33MHz Turbo 040 | $Call |

# ASANTÉ Networking

| | |
|---|---|
| MACCON+ 64K Thick/Thin or Thick/10BaseT | $159 |
| MACCON 3 64K Thick/Thin/10BaseT (Most MACs) | $209 |
| Friendly Net Adapter Thick or Thin or 10BaseT | $79 |
| EN/SC10T SCSI Ethernet with 10BaseT | $249 |
| EN/SC10TPB SCSI Ethernet with 10BaseT for PowerBooks | $309 |
| EN/SC SCSI Ethernet w/ Thick,Thin,10BaseT | $349 |
| EN/SCPB SCSI Ethernet w/ Thick,Thin,10BaseT for PowerBooks | $285 |
| 10THub - 12 port 10BaseT Hub / 8 port 10BaseT | $499 / $249 |
| 12 Port Smart Hub | $Call for Pricing and Options |

# Macintosh Memory

**PowerBook 140/170**

| | |
|---|---|
| 2MB Memory Module | $Call |
| 4MB Memory Module | $Call |
| 6MB Memory Module | $Call |

| | |
|---|---|
| PowerBook 160/180 | $Call |
| Duo 210/230 | $Call |

**Quadra 950**

| | |
|---|---|
| 16mb Module | $Call |
| 256 VRAM | $Call |

**Macintosh Memory**

| | |
|---|---|
| 1mb X 8- 80ns | $Call |
| 2mb x 8 - 80ns | $Call |
| 4mb X 8 - 80ns | $Call |
| 16mb X 8 - 80ns | $Call |

**Mac IIfx**

| | |
|---|---|
| 1mb X 8 - 80ns | $Call |
| 4mb X 8 - 80ns | $Call |
| 16mb X 8 - 80ns | $Call |

**Video (Q700/900)**

| | |
|---|---|
| 256K VRAM | $Call |

NEW ITEMS!

## Modems

**PSI**

| | |
|---|---|
| ComStation1 (24/96/48 S/R fax modem) | $159 |
| ComStation5 (14,400 S/R fax modem) | $515 |
| PowerModem (24/96/48 S/R fax modem) | $135 |
| PowerModem II (24/96/96 S/R fax modem) | $235 |

**Global Village** (for PowerBooks)

| | |
|---|---|
| PowerPort Bronze (24/96 S/R fax modem) | $215 |
| PowerPort Silver (96/96 S/R fax modem) | $435 |
| PowerPort Gold (14,400 S/R fax modem) | $595 |
| TelePort Bronze/Silver/Gold | $199 / 349 / 435 |
| **Supra FAXmodem** | $349 |

## Scanners

**MICROTEK**

| | |
|---|---|
| ScanMaker II | $889 |
| ScanMaker IIXE | $1185 |

**EPSON**

| | |
|---|---|
| ES-600C * | $Call |
| ES-800C * | $Call |

*Shipping with Adobe Photoshop & Scantastic



# NEC

**Silentwriter Model 95**

- Adobe PostScript Level 2 • 6 ppm
- 300 dpi • 35 fonts • 2 MB RAM std
- Auto Interface Monitoring
- AppleTalk, Serial, Parallel Interface

"Printer of the Year 1992" BIS STRATEGIC DECISIONS



MW EDITORS' CHOICE

MultiSync 3FGx Monitor
March 1992

**NEC MultiSync FGMonitors**

- 0.28 mm dot pitch
- Resolution up to 1152 X 870
- Comp. with Mac LC, II family, Quadras
- Incl. Mac Adapter & 2 Year Warranty

| | |
|---|---|
| MultiSync 3FGx (15") | $629 |
| MultiSync 4FG (15" - AccuColor) | $759 |
| MultiSync 5FG (17" - AccuColor) | $1315 |
| MultiSync 6FG (21" - AccuColor) | $2399 |
| Mac FG 8X Interface | $659 |
| Mac FG 24X Interface | $1235 |

**NEC CD-ROMs**

- **MultiSpin** Technology (300KB data transfer rate)
- Double-Door Dust Protection
- MPC Compliance provides smooth video playback

| | |
|---|---|
| CDR-25 Express | $429 |
| CDR-74 Gallery | $849 |
| CDR-74 w/ Mac I/F | $569 |

CD·EXPRESS
CD·GALLERY

NEW! NEC CD-ROMs




NEW Radius Pivot
√ Multi-frequency
√ Low Emissions

# radius

**Monochrome Pivot $699**

15" dual-orientation, anti-glare, full page display, up to 256 shades of gray
√ Multi-frequency
√ Low Emissions





Increase the processing speed of the Mac II up to 8 times, allowing a Mac II to exceed Quadra performance

**Accelerators/Coprocessor**

| | |
|---|---|
| Radius Rocket 25i | $1199 |
| Radius Rocket | $1599 |
| Radius Rocket 33 | $1999 |
| RocketShare | $419 |
| SCSI-2 Booster | $249 |

NEW!

**Radius Displays**

| | |
|---|---|
| Color Display/21 | $1895 |
| PC DIsplay/20 | $2759 |
| PC Display/19 | $2089 |
| Color Pivot | $1289 |
| Full Page DIsplay | $579 |
| 2-Page Display/19 | $899 |
| NEW! 2-Page Display/21E | $1335 |

**Radius I/F Cards/Multimedia**

| | |
|---|---|
| VideoVision | $2009 |
| PrecisionColor 8 I/F | $499 |
| PrecisionColor 8X I/F | $729 |
| PrecisionColor 8XJ I/F | $495 |
| PrecisionColor 24X I/F | $1629 |
| PrecisionColor 24XP I/F | $495 |
| PrecisionColor 24XK I/F | $829 |
| Color Pivot I/F | $505 |
| Monochrome Pivot I/F | $249 |
| Two Page Display I/F | $395 |
| PowerView | $499 |

# SUPERMAC™

**Graphic Displays**

| | |
|---|---|
| SuperMatch 20•T Multimode Trinitron | $2525 |
| SuperMatch 20" Dual Mode Trinitron | $2499 |
| SuperMatch 20" Color | $1515 |
| SuperMatch 17" Multimode Color | $1089 |
| 21" Platinum (Black and White) | $999 |
| Platinum 20 Full-Page | $929 |

**Digital Video Boards / Acceleration**

| | |
|---|---|
| Video Spigot (NuBus / IIsi / LC) | $379 / 339 / 255 |
| VideoSpigot Pro (NuBus or IIsi) | $1095 |
| Spigot and Sound NuBus / Pro | $489 / 1179 |
| ThunderStorm | $845 |

**Graphic Cards**

| | |
|---|---|
| Thunder/24 | $2345 |
| Thunder/8 | $1175 |
| Spectrum/24 Series III | $845 |
| Spectrum/24 | $755 |
| Spectrum/24 Accelerator | $419 |
| Spectrum/8•24 PDQ | $829 |
| Spectrum/8 Series III | $419 |

Graphic Cards • 5 Year Warranty
Graphic Displays • 3 Year Warranty

# RASTEROPS

**Color Display Adapters**

| | |
|---|---|
| RasterOps 24XLi | $1939 |
| PaintBoard 24 / Li | $1549 / 829 |
| RasterOps 8XLi / 8XL | $929 / 465 |
| RasterOps 24Mx / MxQ | $1165 |
| RasterOps 24Sx | $619 |

**Multimedia**

| | |
|---|---|
| RasterOps 24XLTV | $2699 |
| MediaTime | $1549 |
| RasterOps 24STV | $779 |
| RasterOps VideoTime | $1165 |

LIFETIME THREE 3 YEAR WARRANTY

**Graphic Displays**

| | |
|---|---|
| NEW! CorrectColor/20T (2075C) | $3965 |
| 21" Color (2168) | $2799 |
| 20 Multimode Color (2085H) | $1485 |
| 20T MultiScan Trinitron (2075M) | $2479 |
| 21" Mono/Gray Scale (2110) | $999 |
| 15" Mono/GS Portrait (1510) | $505 |
| ClearVue/SD21 (2570) | $1399 |
| 16" Sweet 16 Color (1649) | $1165 |

# ClubMac

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All product information and prices are subject to change without notice. Not responsible for typographical errors.

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## Hard Drives




### MacLand Hard Drives
### Quantum

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| INTERNAL | | EXTERNAL | |
|---|---|---|---|
| 42MB | $199 | 42MB | $279 |
| 85MB | $299 | 85MB | $379 |
| 105MB | $339 | 105MB | $389 |
| 127MB | $359 | 127MB | $429 |
| 170MB | $399 | 170MB | $479 |
| 240MB | $599 | 240MB | $679 |
| 425MB | $899 | 425MB | $999 |

*All MacLand Drives are pre-tested, pre-formatted, and come complete with our own installation and reference manual, DiskMaster Plus™ formatting and utility software, cables and two-year warranty. Internal hard drives also include bracket kits to fit your particular Mac.*



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## Removable Hard Drives

### 44 Megabyte Hard Drives $399

**Cartridges:**

| 100 Pak-ea. | 10 Pak-ea. | 5 Pak-ea. | Singles |
|---|---|---|---|
| $60 | $62 | $63 | $64 |




### 88 Megabyte Hard Drives $449

**Cartridges:**

| 100 Pak-ea. | 10 Pak-ea. | 5 Pak-ea. | Singles |
|---|---|---|---|
| $90 | $92 | $95 | $97 |




## Memory

| | |
|---|---|
| 1MB 80ns | $49 |
| 2MB 80ns | $79 |
| 4MB 80ns | $149 |
| LC/VC II VRAM upgrade | $95 |
| Quadra VRAM upgrade | $59 |

***Please call for other upgrades***

## Monitors



Sony Monitors

1320 **$399**

1304 **$599**

### Monochrome Monitor Specials

*Orion Technologies*



Complete Page Display **$329**

Dual Page Display **$699**

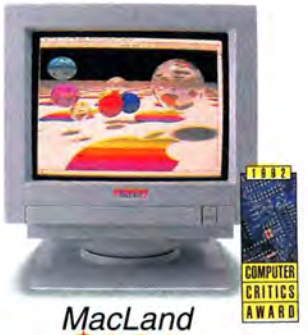
One Year Warranty




*Orion MacScan Ultra*
**$349**
*One-Year Warranty*



*Magnavox*
**$429**
*Two-Year Warranty*




*MacLand*
**$399**
*Two-Year Warranty*

## Videos

***MacAcademy Video Training Tapes***

| | | | |
|---|---|---|---|
| 4th Dimension | Font Management | MacroMind Director | Resolve |
| Accountant Inc. | Freehand 3.1 | Microsoft Works | Superpaint 3.0 |
| Canvas 3.0 | Hypercard 2.0 | Networking Small | System 7 |
| ClarisWorks | Illustrator 3.2 | Pagemaker 4.2 | Utilities, CDEV'S & Inits |
| Design & Layout | Lotus 1-2-3 | Paints & Draws | Wingz 1.1 |
| Dollars & Sense | MacDrawPro 1.0 | Persuasion 2.0 | Word 5.0 |
| Excel 3.0 | MacProject II 2.5 | Photoshop 2.0 | WordPerfect |
| Excel 4.0 | MacWrite II | Powerpoint 2.0 | |
| FileMaker Pro 1.0 | Macintosh 6.0 | QuarkXPress 3.1 | |
| FileMaker Pro 2.0 | Macintosh 7.0 | Quicken 3.0 | |

**$39 each**

Printers

# Dataproducts®



WINNER MacNITA 1991

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*MacUser Magazine*



## LZR 1560™
**$3,195**

- 11" X 17"
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- Postscript Level 2
- 15 Pages Per Minute
- RISC-Based Controller
- Dual Bin
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**$1,695**

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- Powerfull, RISC- Based Processor
- PostScript Level 2
- "Getting Started" Video Tape
- Legal, Letter, Envelopes and Transparancies
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**This Month Only!**



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- **8 Megs of Ram!**
- Postscript Level 2
- Powerful RISC-Based Processor
- Legal, Letter, Envelopes and Transparancies
- **2-Year Warranty**

New Products

# SCANNERS

| | | |
|---|---|---|
| **Microtek:** | ScanMaker II | **$899** |
| | ScanMaker IIxe | **$1199** |
| **Relisys:** | 600 DPI Color Scanner | **$849** |
| | 800 DPI Color Scanner | **$1099** |

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# E-Machines & Apple



**APPLE MAC QUADRA 700 SUPERSYSTEM** Quadra 700 w/8MB RAM, Quantum 120 MB Hard Drive, E-Machines T16II Trinitron Color Monitor & 24-Bit Color VRAM, NewGen 400P (400 DPI) Laser Printer, Apple Ext. Keyboard, UMAX UC-630 24-Bit Color Scanner, PLI 44MB Removable Cartridge Drive, and Quark X-Press OR Aldus PageMaker Software, & ABC Two-Year Service Plan

**$199 mo.***

## E-Machines Monitors

**E-Machines T-16 II** ..... $ 1295/38 mo.*
16" Color Trinitron Tube, FOUR Display Resolutions, Meets Toughest Swedish MPR II Safety Standards, Compatible with Mac IIsi, IIci, IIvx, PowerBooks 160 & 180 (Duos 210 & 230 with Docking Stations) & Quadra Built-In Video

**E-Machines T-19 II** ..... $ 2395/71 mo.*
Extraordinary 19" Display has 19" Color Trinitron Tube, TWO Resolutions: 19" & 21", Meets World's Toughest Swedish MPR II Standards for Unexcelled Safety

## E-Machines Boards

**FUTURA** *(Most Affordable 24-Bit Accelerated Graphics Cards for the Macintosh)*

**FUTURA SX** (24-Bit Accel. for 16" Monitors/8-Bit on 19" – on the fly 8-Bit 16" to 19") ..... $ 495
**FUTURA MX** (24-Bit Accel. Board has on-the-fly 16" & 19" res.) ..... $ 795
**FUTURA LX** (24-Bit Accel. Board has on-the-fly 16" ,19", 21" res.) ..... $ CALL

**DOUBLECOLOR** *(Most Affordable 8-Bit Accelerated Graphics Cards)*

**DOUBLE COLOR LC** (8-Bit up to 16" Res. on Mac LCs) ..... $ 395
**DOUBLE COLOR SX** (8-Bit up to 19" Res.) ..... $ 395
**DOUBLE COLOR LX** (8-Bit up to 21" Res.) ..... $ 595

**COLORLINK** *(Integrated EtherNet & Accel. Graphics give Quadra features to lower-cost Macs)*

**COLORLINK SX/T** (24-Bit to 16" Res. & 8-Bit to 19" Res. ) ..... $ 620
**COLORLINK DC/T** (8-Bit to 16" Res. & 4-Bit to 19" Res. ) ..... $ 495

## Apple Mac Holiday Specials



- Mac IIvx (32MHz, 5MB RAM, 120MB Hard Drive
- Built-In CD ROM with 9 Free Disks
- Seiko 14" Color Monitor w/32,000 Colors
- Extended keyboard & Mouse
- Bundled with BeagleWorks, Norton Utilities, & Maxa Snooper

**$3745/ 140 p/m***



- Mac LC II (4MB RAM, 80MB Hard Drive
- External CD ROM Drive with 9 Free Disks
- Seiko 14" Color Monitor w/32,000 Colors
- Extended keyboard & Mouse
- Bundled with BeagleWorks, Norton Utilities, & Maxa Snooper

**$2630/ 88 p/m***



### NEW! PowerBook 180

- PowerBook 180 (8MB RAM, 80MB Hard Drive, 16 Gray Scale Active Matrix Screen, 32MHz w/Co-Processor)
- Battery Recharger

**$4495/ 169 p/m***

### LC II Complete Starter System



Mac LC II w/4MB RAM, 40MB Hard Drive, Panasonic 14" Color Monitor, Keyboard, HP DeskWriter Printer, Prometheus Ultima Home Office Fax Modem, Bundled with BeagleWorks, Norton Utilities and Maxa Snooper Software, Mousepad & Diskettes

**$2750/102 p/m***

### Mac IIsi Complete System



- Mac IIsi 5/120
- Seiko 14" Color Monitor
- Standard Keyboard
- Prometheus Ultima Home Office
- DeskWriter Printer
- Bundled BeagleWorks, Norton Utilities & Snooper

**$3049/114 p/m***

## Mac CPU Specials w/Software Bundles!

*All Include BEAGLEWORKS, NORTON UTILITIES, MAXA SNOOPER, & DRIVE 7 LITE!*

| | |
|---|---|
| Mac Classic II 4/40 ..... $ 1195/$ 44 mo.* | PowerBook 180 8/80 ..... $ 4285/$ 160 mo.* |
| Mac LC II 4/40 ..... $ 1395/$ 53 mo.* | PowerBook Duo 210 4/80 ..... $ 2330/$ 88 mo.* |
| Mac IIsi 5/120 ..... $ 1985/$ 75 mo.* | PowerBook Duo 230 4/80 ..... $ 2695/$ 101 mo.* |
| Mac CI 5/211 ..... $ 2969/$ 111 mo.* | Quadra 700 4/340 ..... $ 4430/$ 166 mo.* |
| PowerBook 145 4/80 ..... $ 2595/$ 97 mo.* | Quadra 950 8/425 ..... $ 6699/$ 239 mo.* |
| PowerBook 160 4/80 ..... $ 2880/$ 108 mo.* | |

** Per Month on Financing or Lease Plan. Please Call for Details.*

## PowerLink for PowerBooks (NEW)



*E-Machines PowerLink DESKNET*

**$599**

- Mini Docking Station for BOTH PowerBook Duos
- Provides All Standard Apple Ports + ETHERNET
- Provides Video to up to 19" Monitors



*E-Machines PowerLink PRESENTER*

**$425**

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# Printers



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**HP DESKWRITER** ..... $ 399



**SEIKOSHA MAC PRINTER**
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CALL ABOUT NEW WIDE CARRIAGE MODEL!

**QMS 860 HAMMERHEAD LASER PRINTER** .... $ 4150/$ 155 mo.*
600x600 dpi, Tabloid, new generation Canon Engine top features

**PRIME OPTION COLORRIGHT PRINTER** ..... $ 9999/$ 253 mo.*
Outstanding Resolution from Color Dye Sub Printer w/56MB RAM

## NEWGEN PRINTERS



**NEWGEN NEW! TURBO PS/880** ..... $ 3595/134 mo.*
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- IET Level II (Image Enhancement Technology) Smoothen and Sharpens jagged looking characters, curves & angles AND enhances and Enriches Gray Scale Printing
- Auto Interface Emulation Sensing, RISC Processor & Expansion Slots

**NEWGEN NEW! TURBO PS/660** ..... $ 2795/105 mo.*
Same as PS/880, but with 600 DPI Resolution



**NEWGEN PS 400P** 400 DPI Laser Printer $1695/$ 50 mo.*
- 400 x 400 DPI, vs. only 300 x 300 in Apple Personal LaserWriter NTR
- 4MB, Expandable to a full 16 MB!

**NEWGEN PS 300P** 300 DPI Laser Printer ..... $ 1295/49 mo.*

### NEW FROM NEWGEN: THE KILLER B's!



**NEWGEN PS 440B**
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**MAG 14" TRINITRON COLOR MONITOR (.25 dot pitch)** ..... $ 569

**QMS PS 860 LASER PRINTER** ..... $ 4150

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$ 450

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Twice as Fast as the HP XL 300 PS, and Cost per Copy up to 6 Times Cheaper! High Quality Color Printer prints Presentation Quality output on High Quality Plain Paper & on Transparancy Film Smear-Free.
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**RELYSIS 600 DPI COLOR SCANNER** ..... $ 1250/47 mo.*
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- Uses Proprietary COLD-LAMP Technology:
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  - Eliminates cooling fans for Increased Reliability & Accuracy
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| Apple Personal LaserWriter NTR | 1675 |
| GCC PLP II/PLP IIs | 799/1099 |
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| Generations Systems Printers | Call |
| Hewlett Packard LaserJet 4M | Call |
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| E-Machines Futura SX | 499 |
| E-Machines, All Models | Call |
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4611 Appleshare Server 3.0 ... $998.

**Asanté**
*Ethernet Cards for II, IIx, IIcx, IIci, IIfx*
3705 MacCon3 NB ..... $205.
*SCSI Adapters*
4092 EN/SC-10T ..... $258.

**Dayna Communications**
*LocalTalk to Ethernet Adapters*
3240 EtherPrint Plus ..... $468.
3241 EtherPrint-T Plus ..... $468.

**Farallon**
*PhoneNET*
1557 Connectors DIN-8 ..... $29.

**Focus Inc.**
1976 Turbo Net St - Din-8 ..... $19.

**Global Village**
*PowerPort*
4814 Silver 9600 ..... $438.
4813 Gold v.32bis ..... $519.
*TelePort*
3997 Full Fax Send/Receive ... $228.

**Logicode**
*Quicktel Fax Modems*
3888 2400 V.42bis ..... $148.
4176 14,400 V.42bis ..... $328.

**Spider Island Software**
*TeleFinder*
3945 Group Ed.-Unlimited ..... $272.

**STF Technologies, Inc.**
4633 FAX Stf Universal ..... $56.
4635 FAXstf Net ..... $178.

**Supra Corp.**
*Supra FaxModem*
3931 Plus MacPac ..... $178.
4469 V.32 ..... $252.
4016 V.32 MACPAC ..... $328.
4470 V.32bis ..... $298.
4017 V.32bis MACPAC ..... $345.

## Programming

**Bowers Development**
4099 AppMaker 1.5 ..... $214.

**Symantec**
3524 THINK C 5.0 ..... $198.
3393 THINK C Reference ..... $69.
3584 THINK Pascal 4.0 ..... $164.

**TGS Systems**
3616 Prograph V2.5 ..... $298.

## Books

**Addison Wesley**
*Inside Out Series*
3594 Learn C w/Thin C Lite ..... $28.
2997 ResEdit Compl. w/Disk .... $23.

**Ventana Press**
4820 Mac Shareware 500 Book & Disks ..... $28.
4432 System 7 Book/Disk Set .. $24.

## Utilities

**Aladdin Systems**
4971 StuffIt Deluxe 3.0 ..... $65.

**Berkeley Systems**
5341 Star Trek Screen Saver .... $35.

**CE Software**
3388 QuicKeys 2.1 ..... $89.

**Fifth Generation**
4055 FastBack Plus ..... $125.
4696 Suitcase V2.1 ..... $49.

**FWB Software**
3935 Hard Disk ToolKit ..... $126.

**GDT Softworks**
4753 PowerPrint ..... $94.

**Insignia Solutions**
4693 Access PC 2.0 ..... $59.
*Soft PC*
3833 Universal 2.5 ..... $194
3834 AT V2.5 ..... $298.

**Leader Technologies**
5010 PowerMerge ..... $79.

**Metatec/Discovery Systems**
4857 Nautilus BackPac Vol. 3 .. $44.

**MicroMat**
4417 MacEKG 2.0 ..... $98.

**Midnight Software**
4527 DupLocator ..... $62.

**No Hands Software**
4860 Magnet ..... $88.
5317 Syncro ..... $49.

**Quantum Leap**
4871 CD-7 Sys 7 Super CD 3.0 $74.
5209 MegaROM 3.1 ..... $49.

**Sabastian Software**
4033 Image Grabber 3.0 ..... $35.

**Salient**
2581 DiskDoubler ..... $48.

**Symantec**
4303 Norton Utilities 2.0 ..... $99.
3279 S.A.M.III ..... $64.

**Teknosys**
4086 Help! ..... $89.

## Entertainment

**Broderbund**
5028 SimCity Supreme ..... $34.
3603 Kid Pix V1.2 ..... $35.

**Casady & Greene**
4346 Mission Thunderbolt ..... $36.

**Delta Tao Software**
4057 Spaceward Ho! 2.0 ..... $37.

**DigiTek Software**
4250 Hole-In-One Golf ..... $24.

**Electronic Arts**
3496 PGA Tour Golf ..... $38.

**Graphic Simulations**
4070 HELLCATS ..... $39.

**Knowledge Revolution**
4581 Interactive Physics II .... $298.

**Microsoft**
3532 Flight Simulator 4.0 ..... $42.

**Pluma Software**
4640 Capitalist Pig ..... $34.

**Sierra On-Line**
4737 Red Baron ..... $40.

**Soft Wars**
4528 Full Metal Mac ..... $26.

**Velocity**
3596 Spectre ..... $38.

**Virgin Games**
4001 Monopoly ..... $31.
4428 RISK ..... $31.
4000 Scrabble Deluxe ..... $31.

## Music

**Ars Nova**
1209 Practica Musica 2.3 ..... $68.

**Opcode Systems**
3534 EZ Music Starter Kit ..... $158.
2960 Vision ..... $368.

**Software Toolworks**
4072 Miracle (Piano Teacher) $348.

## Accessories

**Apple**
1205 Toner/LaserWriter II ..... $98.

**Articulate Systems**
4558 Voice Navigator SW w/DeskTop Mike ..... $319.
4553 Voice Navigator SW w/Headset Mike ..... $348.

**CoStar**
3454 Stingray- Platinum ..... $88.

**DGR Technologies**
JetInc. Inkjet Twin Pack
4647 Black ..... $17.

**InCom**
4026 CompuCase PowerBook .$78.

**Kensington**
4345 NoteBook Keypad ..... $98.
4692 Turbo Mouse V4.0 ..... $115.

**Key Tronic**
3129 Mac Pro Plus Keyboard .$138.

**L B Innovators, Inc**
*WristSaver*
Red, Navy or Charcoal ea. ..... $12.
*WristSaver Mouse Pads*
Red, Navy or Charcoal ea. ..... $12.

**Logitech**
5518 Kidz Mouse ..... $31
4450 MouseMan ..... $77.

**MicroSpeed**
5013 MacTrac 2.0 (ADB) ..... $74.

**Sony**
3090 High Density 10 Pak ..... $15.

**Sophisticated Circuts**
4005 PowerKey w/Quickeys Lt.. $75.
4993 PowerPad Granite ..... $79.
4994 W/Quickeys 2.1 ..... $118.

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*Since an overwhelming majority of the products we carry are now System 7 compatible, we are no longer indicating so with the 7 symbol. If you have any questions, ask your consultant when you call.*

# As always, overnight shipping is only $3.

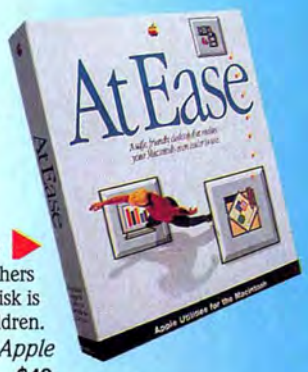



## QuickTime Starter Kit

Apple Includes everything you need to get started with QuickTime – the QuickTime INIT, Movie Player, Movie Converter, PICT Compressor, and a CD-ROM full of QuickTime movies you can integrate into your work. Also comes with a full manual on using QuickTime.

*Apple*

**4608 QuickTime .....$158.**

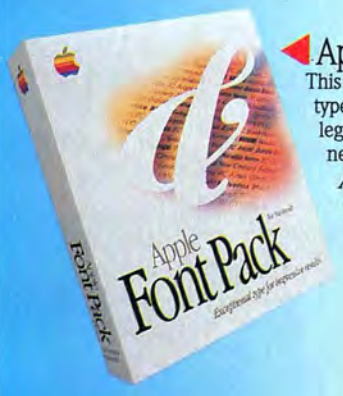



## At Ease

New! Put your mind at ease. You choose which applications you'll allow others to access and put them on the At Ease desktop. The rest of your hard disk is protected by a password. Great for homes with computers and children.

*Apple*

**5247 At Ease .....$49.**

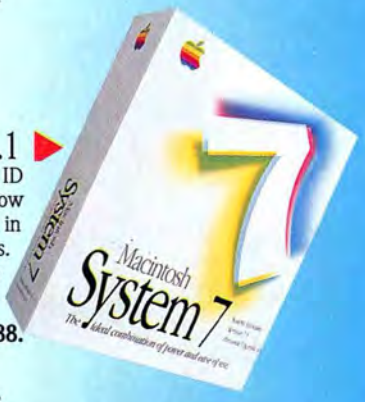



## Apple Font Pack

This is a carefully chosen selection of 43 TrueType fonts from the word's leading type foundries. They are expertly crafted to provide excellent results – maximum legibility on screen and crisp output on paper. The Apple Font Pack includes new display, text, and symbol faces to give you a wide range of type choices.

*Apple*

**5248 Apple Font Pack.....$84.**



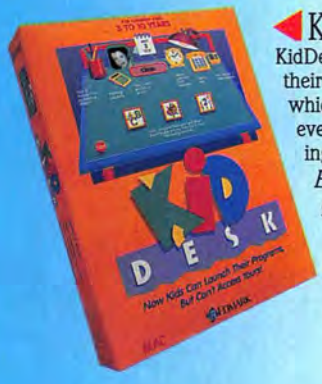

## System 7.1

New! Check out the new features. A new Fonts folder will resolve font ID conflicts automatically. Complex character sets such as Japanese are now supported by World Script. Also includes the all the fixes now included in the System 7 Tune-Up extensions.

*Apple*

**5255 System 7.1 .....$98.**

**5485 System 7.1 Multipack.....$388.**




## KidDesk

KidDesk was designed by early childhood experts to give kids creative control over their computing environment – without putting yours at risk. Parents select which programs appear on KidDesk from those installed on the hard drive. Then even young children can launch their own software programs and learn by playing with the KidDesk accessories.

*Edmark*

**5182 KidDesk .....$28.**



## COMstation Five V.32bis

Just point and click to fax. If you can print a Mac document, then you can fax with COMstation Five. Plus you can keep working in any application while you send and receive faxes. And if you receive a crucial document by fax that needs editing, you don't have to re-key it. That's because optical character recognition (OCR) is a built-in feature.

*PSI Integration* ○

**5340 COMstation Five ....$448.**




## SuperPaint 3.0

It combines painting, drawing, and image enhancement in one powerful, easy-to-use graphics program. With 24-bit color, textures, gradients, and full color TIFF and EPS graphics support, SuperPaint is ideal for anything from the simplest business illustrations to sophisticated full-color art. A six time winner of *Macworld's* "Readers Choice Award!"

*Aldus* ○

**3545 SuperPaint 3.0.....$98.**




## The Norton Utilities & GreatWorks

With the **Norton Utilities** and **GreatWorks**, you can handle just about anything. It's the first such package with the advanced disk repair, data recovery, automatic backup, and other features of the utilities, and the word processing, database, spreadsheet, charting, outlining, painting, and drawing modules of **GreatWorks** – all rolled into one.

*Symantec* ○

**5375 Norton Utilities & GreatWorks.....$99.**

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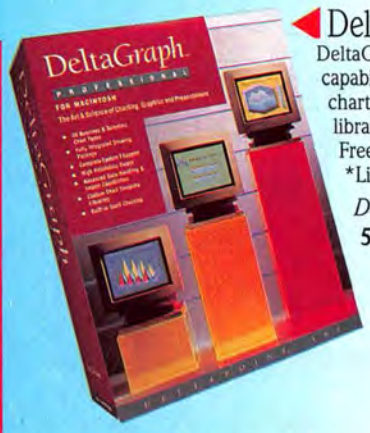
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## DeltaGraph Professional/TI-68 calculator*

DeltaGraph Professional brings you 40 different chart types, with 80 subtypes, and full slide show capabilities in a comprehensive yet easy-to-use program. It handles standard pie, bar, and line charts, and ternary, spider, and bubble charts. It also features preformatted chart and clip art libraries, and extensive data importing capabilities.
Free TI-68 Calculator with purchase.
*Limited time offer.

*DeltaPoint* ○

**5098 DeltaGraph Professional/TI-68 calculator .....$198**



## Bernoulli MacTransportable 90 PRO

Get all the storage reliability you'd expect from Bernoulli for 40 percent less! The new MacTransportable doesn't require an interface kit. Everything you need right to get up and running is in the box including a 90MB cartridge.

*IOMEGA* ○

**5012 Bernoulli MacTransportable 90 PRO .....$499.**




## VideoFusion

Now the same special effects you've seen in television and film presentations can be created on your Macintosh. VideoFusion lets you add magic to your QuickTime movies, video productions, and presentations. Using standard Mac terminology like "cut," "copy," and "paste," you can apply the latest special effects from VideoFusion's library or create your own.

*VideoFusion*

**5165 VideoFusion .....$448.**




## TimesTwo

TimesTwo actually makes your hard disk bigger rather than making your files smaller! A one-time installation converts your hard disk to twice its original size in minutes, leaving your data unchanged. It's completely compatible with all Mac software and works with all SCSI and erasable optical disks.

*Golden Triangle*

**5233 TimesTwo.....$99.**

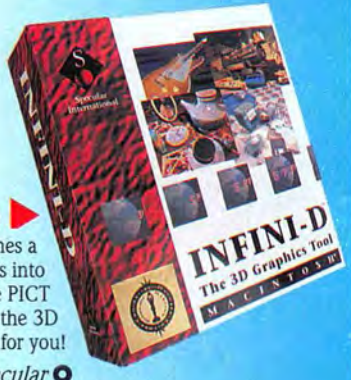



## DesignCAD 2D/3D

Create stunning 2D and 3D designs in a fraction of the time of other programs. In just a few hours you can easily create full-color, gray scale, or black-and-white designs. Use your designs for engineering, animation, desktop publishing, multimedia, and more. If you can conceive of an idea, DesignCAD gives you the power to create it.

*DesignCAD*

**5531 DesignCAD 2D/3D .....$158.**




## Infini-D 2.0

Easy-to-use Infini-D is now in an awesome second generation! It combines a friendly interface with sizzling 3D power: instant conversion of EPS files into 3D objects, blistering rendering speeds (up to 500% faster!), incredible PICT mapping control, and extensive QuickTime support make Infini-D 2.0 the 3D package for you!

*Specular* ○

**4818 Infini-D 2.0 .....$648.**




## Sketcher

Create realistic natural-media effects on your Mac with Sketcher, the affordable yet revolutionary program for creating grayscale graphics and retouching images. Sketcher duplicates the effects of traditional tools and textures. Use dozens of brushes, pens, chalks, and even paper grains and image processing tools to apply your artist's touch to the desktop.

*Fractal Design* ○

**5052 Sketcher 1.0.....$98**




## Painter 1.2/ArtZ bundle

Simulate the tools and textures of natural media with **Painter**, the remarkable 24-bit color paint program. Create original art or apply natural media effects to other artwork, including scanned images. Used with the **ArtZ** 6" X 8" tablet, the effects are astonishing. The latest from the premiere tablet maker, ArtZ's stylus is cordless, batteryless, and detects 120 levels of pressure.

*Fractal Design/Wacom Technology*

**4694/5355 Painter 1.2/ArtZ ADB Tablet bundle.....$508.**

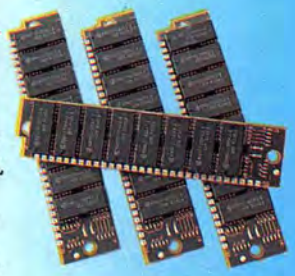
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## SIMMs



Expand the memory of your Mac! More memory means increased task processing and the ability to switch between several applications running at once. Also includes the Mac's Place installation manual, the most complete SIMM installation guide available.

*Mac's Place*

**SIMMs .....CALL**

## TouchBASE/DateBook bundle

Get organized with this bundle at a fantastic price. **DateBook** is the ultimate personal time manager. It combines calendar, scheduling, alarms, and To-Do lists to keep track of all your daily activities. And **TouchBASE** keeps all of your personal contacts at your fingertips. Together they form a powerful personal information manager.

*After Hours*

**5002 TouchBASE/DateBook bundle .....$98.**




## StuffIt Space Saver/StuffIt Deluxe 3.0




**StuffIt SpaceSaver** provides complete on-the-fly compression. Increases disk space (with lightning speed) without effort on your part. **StuffIt Deluxe**, the most efficient compression product available, solves all your compression needs, from archiving to transparent compression, and includes StuffIt SpaceSaver.

*Aladdin Systems* ○

**4971 Stuffit Deluxe .....$68.**

**4969 Stuffit SpaceSaver .....$38.**

## Disk Café

If you use drives from different manufacturers, you need to format them all with the same utility. Disk Café is a complete storage formatting utility that works with nearly every drive available. So it can prevent compatibility problems including data loss. And its advanced diagnostic tools detect and repair disk defects.

*Bering*

**5121 Disk Cafe .....$45.**

## DiskFit Direct

DiskFit Direct is a fast, easy, and affordable backup for your Macintosh. Launch it, click "BackUp," and insert disks. DiskFit Direct creates an exact copy of your hard disk in Finder format on any removeable disk, including floppies and SyQuests.

*Dantz* ○

**5491 DiskFit Direct .....$32.**




## HayesConnect/SmartCom II




**HayesConnect**-Network serial device sharing software allows any serial device to be shared over a network from a server. **SmartCom II**-Communications program features error-free transfers via Hayes Verification, XMODEM, MacTerminal XMODEM, VT 100/102, VT52, & TTY emulation. Plus many other features!

*Hayes*

**4314 HayesConnect.....$74.**

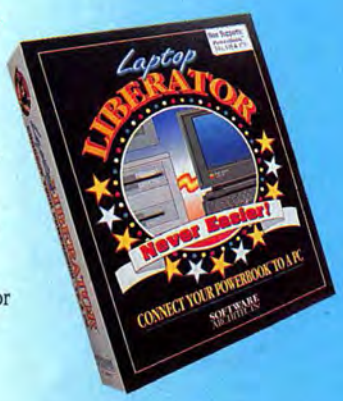
**1628 SmartCom II 3.3 .....$83.**

## Laptop Liberator

Use your PowerBook like never before. With Laptop Liberator, any PowerBook can act as an external hard drive. Connect it to a desktop Mac or PC and transfer files back and forth. Laptop Liberator uses a PowerBridge connector and an Apple SCSI Disk Adapter to make the connection.

*Software Architects*

**5267 Laptop Liberator.....$198.**






## TurboPS/400P

The TurboPS/400P produces brilliant 400 by 400 dpi – almost twice the resolution of standard 300 dpi laser printers. Add to that Image Enhancement Technology to smooth characters, sharpen curves and angles, and eliminate jagged lines. It's ideal for the desktop publisher or business graphics user.

*NewGen Systems*

**5259 TurboPS/400P .....$1898.**

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## Snooper/Norton Utilities for Mac




Find problems fast with Snooper, the revolutionary suite of hardware diagnostic and testing tools. And for a limited time, get Norton Utilities For Mac FREE. Snooper is easy-to-use, powerful, and saves you time and money. No set of Mac utilities is complete without Snooper, the hardware diagnostic.

*Maxa*

**5349 Snooper w/ Norton Bundle.....$118.**
**5350 SnooperKit w/ Norton Bundle .$148.**

## Daymaker




New version! Daymaker 2.0 is faster and filled with new features. A Recurring Events function schedules upcoming events with more flexibility. The "To Do" view organizes "to do" items. Reports can be previewed before printing and will be sharper with integrated DYNoPAGE.

*Pastel* ●

**5261 Daymaker 2.0.....$82.**

## Lemmings




Lemmings for the Mac has arrived! Now Mac owners can demonstrate their game playing smarts and test their sanity, saving mobs of imperiled green-haired rodents from certain doom. Lemmings for the Mac brings you 120 levels of original and intellectually challenging gameplay.

*Psygnosys*

**5459 Lemmings.....$35.**

## Falcon MC




Now you can experience the colorful, high-flying thrill of an F-16 fighter. More than 12 missions put you into instant action. Engage in a dogfight with a MiG 29, while dodging anti-aircraft missiles. Then knock out enemy resources – factories, power plants, tanks, truck convoys. In full color.

*Spectrum HoloByte*

**5382 Falcon MC.....$45.**

## The Miracle



This is the first keyboard that teaches you how to play it! It makes learning even the basics a pleasure. Includes a professional keyboard with 49 standard-sized velocity-sensitive keys, 128 digitized instruments and sounds, full MIDI compatibility, hundreds of songs and lessons, and full orchestral accompaniment.

*The Software Toolworks*

**4072 The Miracle .....$378.**

## Spaceship Warlock/Creepy Castle

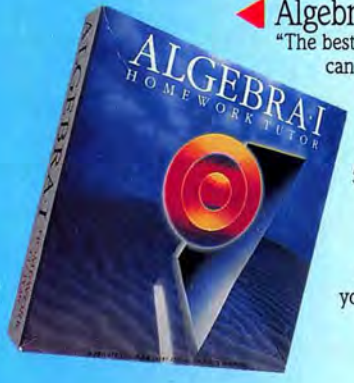



**Spaceship Warlock** is 125 megabytes of graphics, animation, and original music in a science fiction "interactive movie" adventure game. 1991 Game Hall of Fame "Best CD-ROM" award from *Macworld*. **Creepy Castle** is an arcade style action/adventure game featuring animated monsters, dual voice digitized sound effects, four challenging scenarios, and four levels of difficulty.

*Reactor, Inc.*

**5100 Spaceship Warlock.....$58.**
**4079 Creepy Castle .....$32.**

## Algebra I




"The best algebra tutorial program I have seen." (*Macworld*, 4-91) This program can generate problems or take problems from a student's own text book. Students are checked on every step toward the solution and can request a series of increasingly more specific hints when they have trouble.

*Missing Link* ●

**5150 Algebra I.....$49.**

## Get hooked on Diamonds.




"The most addictive game since Crystal Quest." (Bob Levitus, *MacUser*) Diamonds 2.0 is a challenging and entertaining game for all ages. Try to work your way through 30 levels of intense challenge and excitement. There's even a built-in editor so you can create your own fun levels.

*Varcon Systems*

**5162 Diamonds 2.0 (pictured) .....$26.**
**5461 Jewelbox.....$26.**
**5462 Aces with Tens.....$26.**

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## Capitalist Pig




This thought-provoking business simulation lets you start and run a business in the privacy and saftey of your own computer. Choose your company name, stock logo, product, and source of capital. Then set your business, financial, and marketing plans – the clock starts ticking and you're in business!

*Pluma*

**4640 Capitalist Pig .....$34.**

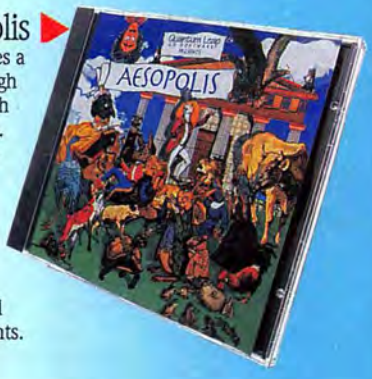
## PAX IMPERIA

Experience a universe of adventure and conquest. Rule an expanding empire while pursuing diplomatic relations with other emperors in neighboring star systems. Race for technological advancement and planetary discovery. Go where no Mac has gone before!

*Changeling Software*

**4992 Pax Imperia .....$34.**

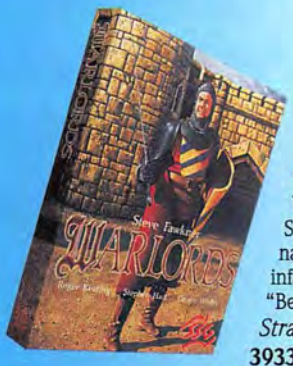
## Aesopolis




Bring Aesop's fables to life with multimedia. This enchanting CD-ROM features a stunning virtual museum with thousands of splendid color canvases and high fidelity sounds. Double-clicking on one of the artworks reveals both screen-written and spoken versions of the fables.

*Quantum Leap*

**4870 Aesopolis.....$49.**




## Be the hero of your empire!

Warlords is a fight to the finish where only one of eight empires will prevail! Starting from your home castle you ruthlessly expand your territory and eliminate all other players. Train sixteen different army types ranging from conventional infantry to dragons. Use your wits to out-think and out-fight cruel and wily opponents. "Best Wargame of the Year" – *Computer Gaming World Magazine.*

*Strategic Studies Group*

**3933 Warlords .....$38.**

## Strategic Conquest and Spaceword Ho!




**Spaceward Ho!** 2.0 challenges you to colonize the galaxy against up to 20 computer players or human opponents on a network. Build fleets, research technologies, and conquer new worlds. **Strategic Conquest 3.0** is the latest version of the classic game of military stratagy. Maneuver armies, planes, and boats to conquer every island and continent against the computer or a friend.

*Delta Tao* ○

**4057 Spaceword Ho! .....$37.**

**2891 Strategic Conquest .....$37.**




## Hellcats and Mission at Leyte Gulf

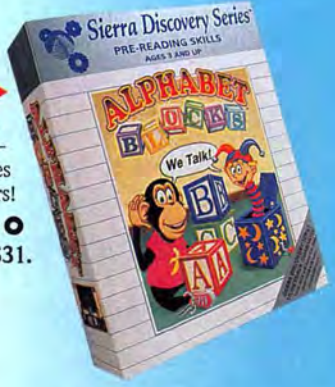
**Hellcats** is the most realistic flight simulator ever! In **Missions At Leyte Gulf**, you load your Hellcat with torpedoes, rockets, or bombs. Support a ground assault and neutralize enemy tanks and ground vehicles, or protect your fleet positions against sub attacks.

*Graphic Simulations*

**4070 Hellcats Over the Pacific .....$39.**

**4998 Missions at Leyte Gulf .....$22.**

## Alphabet Blocks




Now any child who can use a mouse can learn to read with Alphabet Blocks. In this fun introduction to alphabet sounds and names, two computer friends – a chimp and a jack-in-the-box – gently coach your child through the basic rules of reading. Kids have a great time with these infinitely patient tutors!

*Sierra On-Line* ○

**5533 Alphabet Blocks.....$31.**




## Victor, Vector & Yondo: The Vampire's Coffin

New! This adventure on CD-ROM integrates spectacular live action, sound, and music! Your mission is to retrieve Dracula's coffin while fending off evil beings. Truly interact with the play environment and use your creativity, skill, and intelligence to overcome obstacles.

*Sanctuary Woods*

**5168 Victor, Vector & Yondo: The Vampire's Coffin .....$39.**

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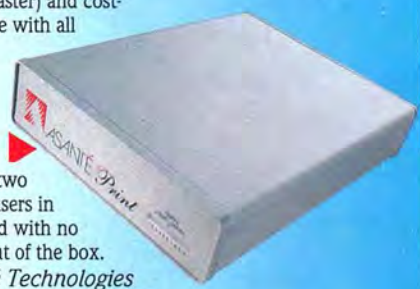


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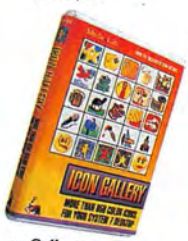

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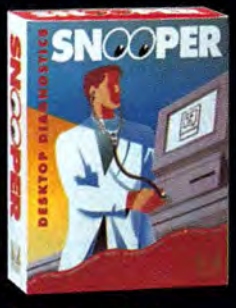

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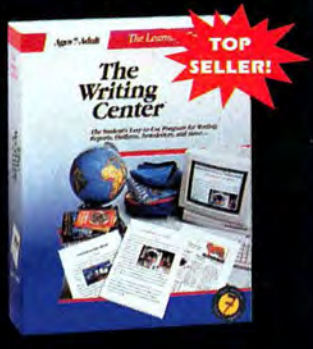



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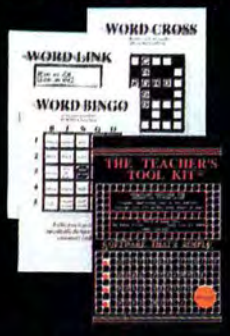



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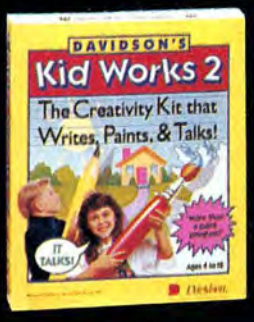



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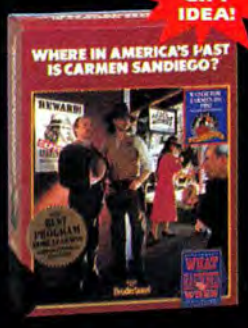



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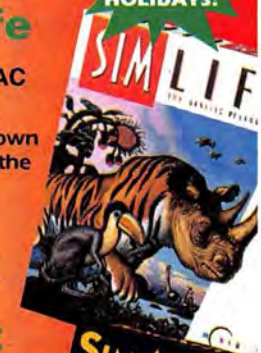
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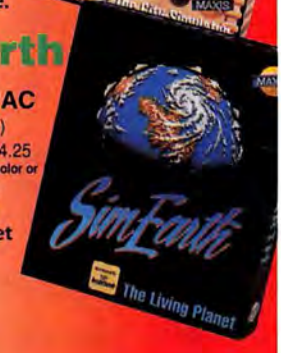

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According to Byte magazine's extensive tests, the Microdisk is the fastest MAC drive available. With record-setting effective access times as low as 3.9 milliseconds, data transfer rates as high as 10.0 megabytes/second, and a five-year disk drive warranty, the Microdisk is the drive you need for high performance applications.

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- 1.03 Gigs
- 670 Megs
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### David the Dinosaur

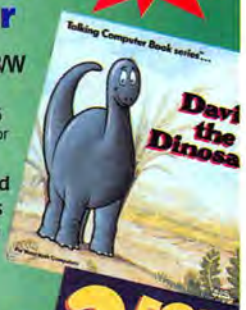
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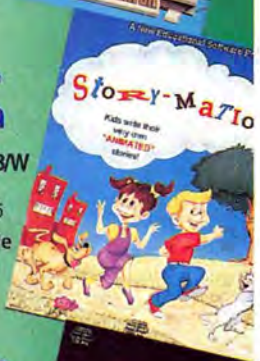

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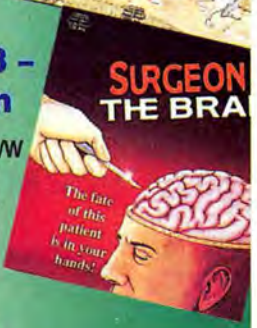

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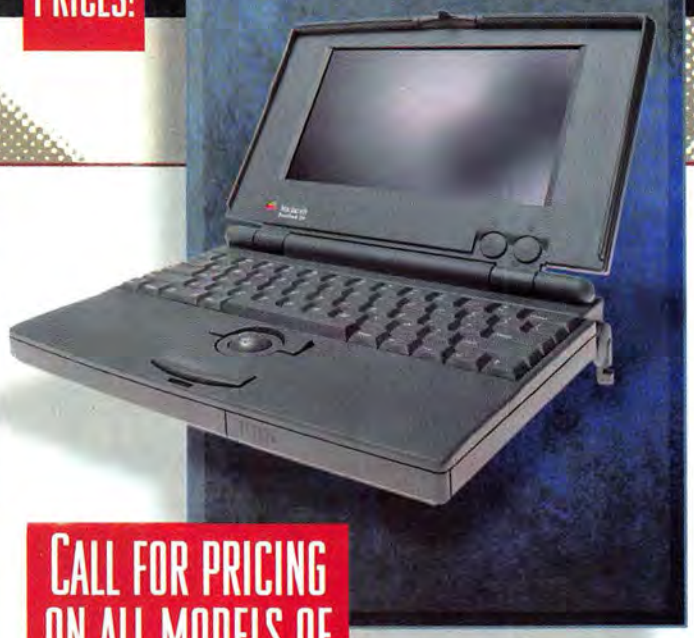
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| Asante 10T Hub/12 | 559.00 |
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Accelerate your Mac IIci or IIsi by up to 350% with Logica's new line of 68030 accelerators! The LogiCache 50MHz '030 is hundreds of dollars less than DayStar, and has a full 64K of cache RAM (twice as much as DayStar.) For an economical performance boost, try the LogiCache IIci or IIsi for a 40% speedup. All Logica cards for the IIsi can use the IIsi Dual Slot Adapter, to allow use of the cache card as well as other video or Ethernet cards in your IIsi. Logica math coprocessors for the LC, LC II, and Classic II increase math calculations over 100%. For maximum performance, choose '040 accelerators from Fusion Data or Radius.

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| Firmware Upgrades | From tape | Chip replacement |
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| OEM | Hewlett Packard | Archive |
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| MTBF | 50,000 hours | 40,000 hours |
| Software | Retrospect | Retrospect |

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| 45 SR (SyQuest) w/cartridge | | 445.00 |
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| DATadrive 2GB | | 1395.00 |
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| | INTERNAL | EXTERNAL |
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| Go•80** | 439.00 | 529.00 |
| Go•120** | 519.00 | 609.00 |
| 120 MB | 399.00 | 489.00 |
| 240 MB | CALL | CALL |
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| 830 MB | 1419.00 | 1519.00 |
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| 1.5 GB/2.0 GB | CALL | CALL |




All of our DAT drives include Retrospect 1.3, one DAT cassette, one DAT cleaning cassette, and your choice of SCSI cable.

SyQuest, Optical, and DAT available internally for the Quadra 950!

*One Year Warranty
**Internals for PowerBooks only

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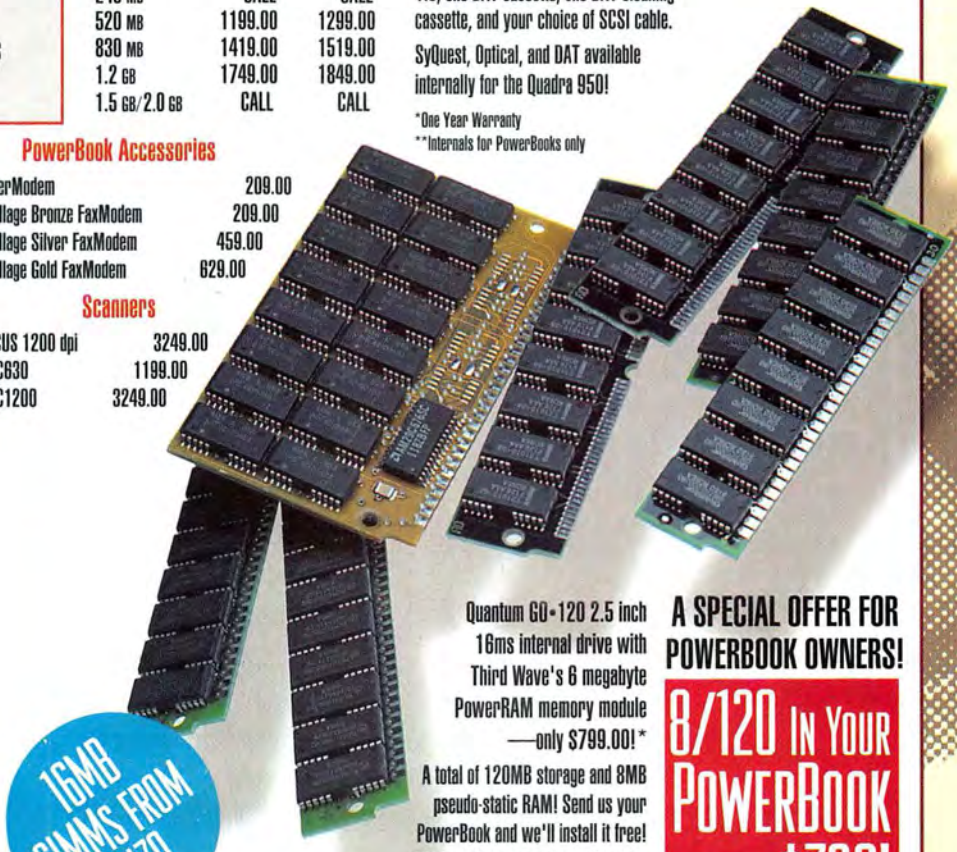
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|---|---|
| 60 MB Tape for Teac | 17.00 |
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| DAT cassette 60 or 90 meter | 17.00 / 29.00 |
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| Optical cartridge 128 MB | 45.00 |
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| Global Village Bronze FaxModem | 209.00 |
| Global Village Silver FaxModem | 459.00 |
| Global Village Gold FaxModem | 629.00 |

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| UMAX UC630 | 1199.00 |
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| 16MB SIMM (Quadra 700) | 499.00 |
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| PowerBook 4MB | 169.00 |
| PowerBook 6 MB | 239.00 |
| PowerBook 100 4MB | 179.00 |
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SIMM Prices subject to change, reflect cash discount.

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"With MacUser, the editors understand that product information is of utmost importance to business buyers who need to know about available products...and which ones they should purchase.

"Our MacUser advertising has been getting such overwhelming sales that we have to add phone lines on a regular basis to take the extra inquiries. It seems like every time we add a phone line, it's busy. So, that's how we know that MacUser is pulling.

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- *14400bps Modem*
- *14400bps FaxModem*
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Magic VFX V.32bis .....$259
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- *For the Mac SE, Plus & Classic*
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- *One-Year Warranty*
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*The Center Of The Macintosh Universe™*

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MacUser ★★★★

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| Silentwriter Model 95FX | *$Call!* |
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| PS 815MR | $3895 |

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## OPTICAL DRIVES

**256 MB 3.5" Optical**



Ask about our FREE Christmas Puma bundles!!

PUMA captured, but not tame™

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| Cayman | | Shiva | |
|---|---|---|---|
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| GatorPrint | $399 | Netmodem/E | $1479 |

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MW ★★★★



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### USRobotics

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### Global Village

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UMax MacUser ★★★★




### UMAX

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### Sharp

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### MicroTek

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| 1850 ScanMaker | $1499 |

## HARD DRIVES

### Falcon Micropolis Drives

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*Prices valid 11/28/92 - 12/28/92*

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## ACCELERATORS: 68040 & 68030

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Buy an Eagle™ and get two 44MB cartridges for only $89!



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| 4 Meg 80ns | $125 (with trade in) |
| | LIFETIME |
| 1 Meg 80ns | $35 |
| | WARRANTY |
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| 6 Meg PowerBook Memory | $259 |

*Due to the extremely volatile state of SIMM pricing as we went to press, all memory prices subject to change without notice.*

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| MultiSync 4FG | $759 |

**SONY.**

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**21" MONITORS AT A 19" PRICE!**

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**$739** grey-scale

Lapis




1024 x 828 Resolution @ 74 dpi, with a 75 Hz Flicker-Free refresh rate, same as the Apple Two-Page Display. Available for all Macintoshes.

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SUPERMAC

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MacWeek, February 1991

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## MarketPlace

The cost-effective buying arena that provides sellers of Macintosh compatible products 3 advertising options: Premier, Classified and BusinessCard to meet their specific advertising goals, reaching 410,000 Macintosh Business Buyers. All sections are set up by product category and offer reader service.

## Premier

The four-color showcase that spotlights leading-edge products and services.

330-335

## Classified

Flexible-format display advertising that offers diverse sizes plus two and three color options. Section meets dynamic advertising needs for all Macintosh products and services.

336-353

## Business Card

A forum for innovative, unique, low-cost and hard-to-find Macintosh hardware, software, and miscellaneous products and services.

354-355

## Product Categories

| | Premier | Classified | BusinessCard |
|---|---|---|---|
| **Hardware** | | | |
| Accelerator Boards | 330 | 336 | |
| Bar Coding | | 336 | |
| CD-Rom | | | |
| Communications | | | |
| Computer Systems | | 336 | |
| Data Acquisition | | | |
| Data Recovery Services | | 342 | 354 |
| Disk Drives | 330 | 342 | |
| Diskettes | | | |
| General | | 343 | |
| Input Devices | 331 | | |
| Insurance | | 343 | 354 |
| Memory Upgrades | | 343 | 354 |
| Networking | | | |
| Peripherals | 331 | 346 | |
| Power Supplies | | | |
| Printers | | | |
| Scanners | | | |
| Security | | | |
| Tape Drives | | | |
| Used Equipment | | | |
| **Software** | | | |
| Accounting | 332 | | 354 |
| Back Up Systems | | | |
| Bar Coding | 332 | 348 | |
| Business | 332 | 348 | 354 |
| Business Time Management | | | |
| CAD/CAM | | 348 | |
| CD-ROM | 333 | 349 | 354 |
| Communications/Networking | | 348 | |
| Desktop Publishing | | 348 | |
| Educational | 333 | 348 | 354 |
| Emulation | | | |
| Engineering | | 350 | 354 |
| Entertainment/Games | 334 | 350 | 354 |
| Financial | | | 355 |
| Fonts | | 350 | |
| Foreign Languages | 334 | 350 | |
| Genealogy | | 350 | |
| General | | | 355 |
| Government | | | |
| Graphics | 334 | 350 | |
| Health | | | 355 |
| Language Tools | | | |
| Legal | | | |
| Lottery | | | |
| Medical/Dental | | | 355 |
| Music/MIDI | 334 | 351 | |
| Networking | | | |
| Personal Management | | | 355 |
| Programming Tools | 335 | | 355 |
| Public Domain | | 352 | |
| Real Estate | | | 355 |
| Recreation | | | 355 |
| Religion | 335 | | |
| Sales Marketing | | | |
| Scientific | | 352 | 355 |
| Security | | | |
| Shareware | | 352 | |
| Statistics | | | |
| Taxes | | | |
| Travel/Leisure | | | |
| Utilities | | | 355 |
| **Miscellaneous** | | | |
| Accessories | 335 | 352 | |
| Books/Catalogues | | | |
| Business Opportunities | | | |
| Consulting/Programming | | | |
| Data Conversion Services | | 352 | |
| Desktop Publishing Services | | 352 | 355 |
| Diskette Copy Services | | 352 | |
| Furniture | | | |
| Insurance | | | |
| Novelties | | | |
| Services/Repair | | | 355 |
| Slide Imaging Services | 335 | 352 | |
| Supplies | 335 | 353 | |
| Training | | | 355 |

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| 240 LPS 10ms | 655 | 675 | 615 |
| 425 10ms | 1039 | 1059 | 999 |
| 42 ELS 17ms | 239 | 259 | 199 |
| 85 ELS 17ms | 329 | 349 | 289 |
| 127 ELS 17ms | 389 | 409 | 349 |
| 170 ELS 17ms | 465 | 485 | 425 |
| TMS Pro R45 • cartridge included | | | 429 |
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| TMS CD ROM | | | 509 |

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MacUser EDITORS' CHOICE 1991

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800·ASK·4TMS

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33 Mhz PowerCache $535.95 • w/ FPU, $665.95
FastCache IIsi $279.95 • w/ FPU, $339.95
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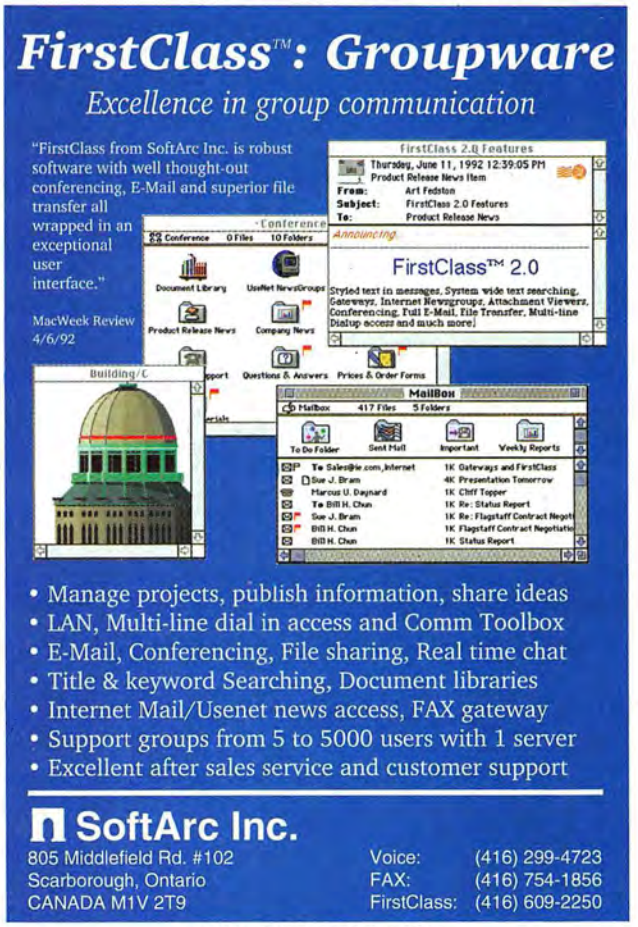
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CIRCLE 258 ON READER SERVICE CARD




CIRCLE 259 ON READER SERVICE CARD




CIRCLE 260 ON READER SERVICE CARD




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MacUser Premier

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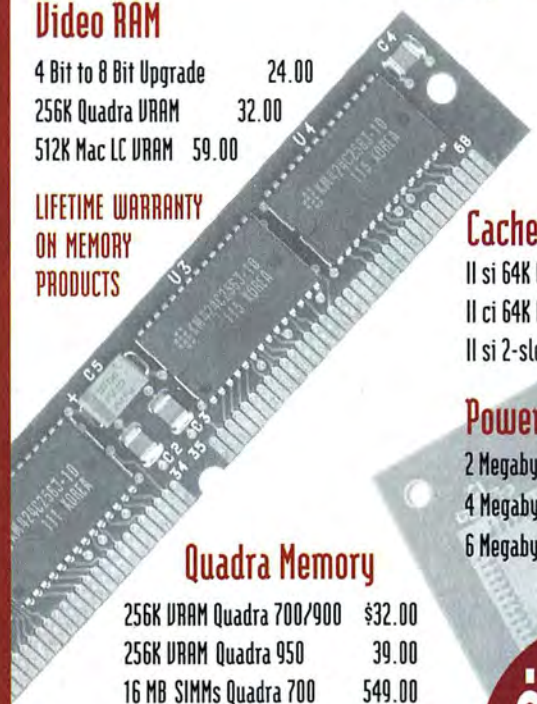
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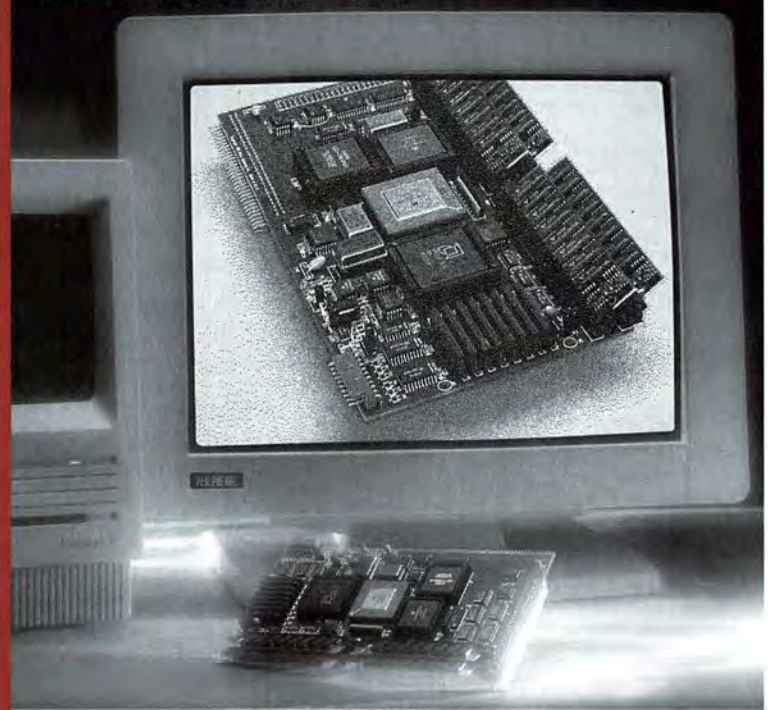
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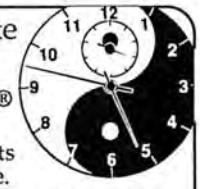
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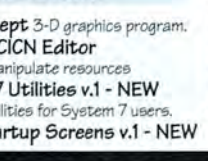
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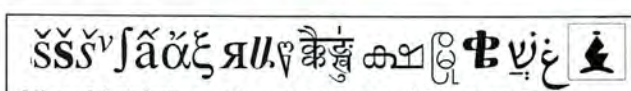
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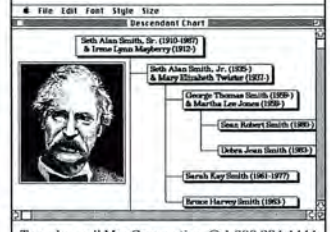
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Source: ABC June 1992

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**In the past 12 months, 8 in 10 MacUser subscribers purchased products by mail order; 91% of these purchased software through mail order.**
***Did they buy from you?***
Source: MacUser Mail Order Report, 1991, (past 12 months); ABC June 1992

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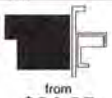
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CIRCLE 382 ON READER SERVICE CARD

**MacUser subscribers are responsive mail order buyers.**

MacUser subscribers respond to mail order ads for Macintosh computer products. In the past 12 months, 8 in 10 MacUser subscribers made mail order purchases. 2 in 3 subscribers made a purchases within the past 6 months – 74% of these purchased from a mail order ad they saw in a computer magazine.

*Reach these responsive business buyers. Call your MacUser Marketplace account representative today!*

800-825-4237

Source: MacUser Mail Order Report, 1991

***Reach those who count!***

Advertise in MacUser and reach business buyers making Mac purchasing decisions. Nearly 8 in 10 MacUser subscribers are directly involved in their organizations' decisions to acquire Macintosh computer products. In fact,

- 74% initiate purchases
- 73% are involved in brand selection
- 63% are involved in selecting the purchase source
- 40% authorize purchases.

For advertising information, call your MacUser Marketplace account representative today at **800-825-4237.**

Source: MacUser 1992 Study of Microcomputer Product Ownership and Buying Plans

***Did they buy from you?***

In the past 12 months, 8 in 10 MacUser subscribers purchased products by mail order; 91% of these purchased software through mail order.

Source: MacUser Mail Order Report, 1991

# BUSINESSCARD

*MacUser's BusinessCard section is a forum for innovative, hard-to-find and low-cost MAC products and services. Ads are listed by product category and include Reader Service numbers to allow fast, easy response.*

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1 issue–$460, 3 issues–$440, 6 issues–$430, 12 issues–$415.
Multiple-ad per issue rates also available.
Prepayment must accompany each insertion.
AMEX/VISA/MC welcomed.

**AD FORMAT:**
MacUser will design and typeset each BusinessCard ad. Advertisers should furnish typewritten copy. Ads include: 1) Headline (1 line, initial caps=30 characters max, all caps=25 characters max), 2) Descriptive copy (5 lines, 225 characters max), 3) Company name (same specifications as headline), and 4) Address and telephone number (2 lines, 40 characters per line). No logos, artwork or camera-ready ads. Publisher reserves the right to edit supplied copy to meet section specifications.

**DEADLINES:**
MacUser is published 12 times a year.
The BusinessCard closing is approximately two months prior to issue date.
Please send copy and payment to: MacUser BusinessCard, One Park Avenue, 3rd Floor, New York, NY 10016, ATT'N: Paul Fusco.
*For more information, call Paul Fusco at* **800-825-4237** *or* **212-503-5866, FAX: 212-503-5860.**

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JOHN C. DVORAK

# The Plot Sickens



**The international graphical-user-interface conspiracy, revealed at last!**



The following memo was intercepted by the United States Government. Although government officials refuse to comment on the origin or nature of the memo, it appears to UFOlogists to be part of a series of anthropological studies sent by the sociologists of an alien culture to their home planet.

## Rollwynn Earth Update

**Rez date:** 997533
**Subtopic:** Personal-Computer Market and Societal Trends
**For:** Great Leader Corps Planets Stratus I and Stratus II

Great Leaders,

Earth is in a free-fall cultural decline, which we have spent the last decade attempting to understand. We think we have traced it to an event that took place in 1984 (Earth time).

It was then that a peculiar computer called the Macintosh appeared on the Earth market. Along with it was introduced a peculiar counterproductive computing interface called the GOO-EE, which means graphical-oriented operating environment for everyone.

Our analysis has determined that the GOO-EE interface has had an adverse effect on Earth and its economy and social structure.

When the Macintosh was introduced, Earth's economy was growing rapidly. When the computer began to become popular in 1987, the U.S. stock market collapsed. It soon recovered, but all of Earth's economies later began a slow decline. A competitor arrived on the scene, developed by a fellow named Bill (short for billion) Gates. This product, called Windows, introduced the GOO-EE to the rest of the computing world. Windows became popular with the release of versions 3.0 and 3.1. When these versions were released, Earth's economies were sent into deep recession. The GOO-EE system was obviously responsible in some way or another. Luckily, in our culture, speech recognition was perfected early.

We are continuing to observe the worsening situation on Earth and will attempt to determine the exact mechanism that is causing it. The situation team led by coordinator Tyv-2 has discovered two phenomena that we are monitoring closely:

**1. Iconization.** The GOO-EE system uses something called an icon to portray a file or a program. The iconization of reality was invented by the Chinese. Although it is rich in its ability to expand a language, the drawback is that it's old-fashioned – a throwback. The iconization of reality may have triggered a societal mechanism that actually reverses history. This happened on the planet X88 when the Mufflin culture jokingly readopted click-talk and found its history reversed. The Mufflins now wear loincloths and talk by swallowing air and belching. Observers believe that this will happen on Earth soon.

**2. Nutrition degeneration.** People involved with computers have adopted a peculiar diet that seems to be a throwback to some past age. Their drink consists of a brown sugar-and-acid mixture called cola. It seems to be addictive. The solid food consists of a flattened and cooked water/flour mixture onto which the Earthlings smear a tomato paste and coagulated cow 's milk. Some of these creatures have the cow ground up and made into a patty, which is crudely fried and placed between two fluffy cooked water/flour insulators to keep the fat and juice from running onto their hands. The cow seems to be the primary source of food and is worshipped by these people. Cow T-shirts and posters are religious items, which the people use for adornment.

Needless to say, further research needs to be done. One thing is certain: As their culture degenerates, the Earthlings pose no threat to our civilization. In fact, their space-exploration programs have been all but canceled and we expect the entire civilization to eventually prefer mud-hut dwelling to anything they currently enjoy. We have to assume that the GOO-EE interface is the triggering mechanism.

ILLUSTRATION: ROBERT ZIMMERMAN

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